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NetworkWorld

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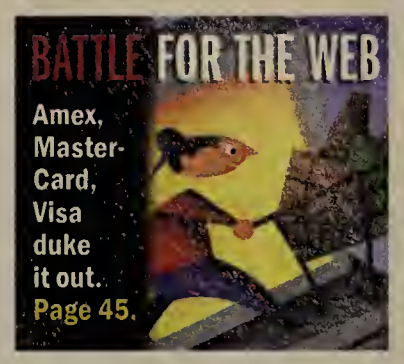

Server leaders push WinNT to SMP limit

By Ben Heskett

It's starting to look like it could become the mother of all motherboards.

Intel Corp.'s Standard High Volume (SHV) four-processor Pentium Pro motherboard will soon be powering a fleet of Windows NT-based machines that server vendors hope will become a new standard in symmetrical multiprocessing (SMP).

The servers promise to give RISC machines running Unix a fight for customers' SMP dollars. Not only will the Pentium Pro/NT machines be cheaper, they will likely encourage a slew of developers to port popular applications to the platform.

By the end of next month, Compaq Computer Corp., Hewlett-Packard Co. and Dell Computer Corp. will all announce Pentium Pro-based models that support the SHV board (see graphic). AST Research, Inc.

See **Server,** *page 14*

COMING ATTRACTIONS

May 13: Unisys will announce a Pentium Pro (p6) line of servers from its PC unit at a New York event. NeTpower also will release a p6-based line called Sparta.

May 29: At an event in San Francisco, HP will introduce the NetServer LX p6 line. HP will also introduce a p6 failover clustering system based on the Fibre Channel hardware interconnect (see related story, page 14).

June 3: Compaq will introduce the ProLiant 5000, a p6-based line of servers.

June 17: Dell will demonstrate low-end, mid-range and high-end p6-based servers at PC Expo in New York.

Note: All announcements include configurations of one to four 200-MHz p6 processors based on Intel's Standard High Volume processor board.

ATM under the gun

Technology heralded as end-to-end may not go nearly so far, critics and backers agree.

By Jodi Cohen

San Jose, Calif.

The Asynchronous Transfer Mode industry has started to take a hard look at itself, and what it is seeing is not pretty.

Fore Systems' *Eric Cooper is an ATM optimist.*

The consensus at the ATM Year 96 show here last week was that LAN switching is clobbering ATM at the desktop and on the workgroup. At the same time, ATM faces competition from new technologies that could push it completely out of the LAN.

For every question about ATM technologies such as Multiprotocol over ATM (MPOA) and available bit rate, there seemed to be another about emerging alternatives such as gigabit Ethernet, IP switching or Cells in Frames (CIF).

"A few years ago, the question was *if* ATM would fit into customers' LAN plans, then it was *when,* and now it's back to *if,*" said Scott McAuliffe, technical sales representative for MMC Networks, Inc.

"No doubt about it; ATM is vulnerable," said Kevin Fong, a partner with Mayfield Fund, a Menlo Park, Calif., venture cap-

See **ATM,** *page 65*

Telecom competition

Rochester, N.Y.: Land of the free market

By Tim Greene

Rochester, N.Y.

Michael Schauseil must worry sometimes that he'll wake up and find out that the past 15 months have been some crazy, wonderful dream in which phone companies keep forcing lower and lower prices on him.

All Schauseil has to do is wave someone else's lower offer under his provider's nose and the provider whips out an even lower counteroffer.

It all started in January of last year when the state of New York agreed to let the former Rochester Telephone Co. sell long-haul, cable and cellular services in exchange for opening the

See **Rochester,** *page 64*

Competition *has saved BC/BS's Schauseil hundreds of thousands of dollars.*

PHIL MATT

Network management at home on Web

By Jim Duffy

People who think the World-Wide Web is more of a toy than a practical business tool may want to think again.

Indiana University is using the Web to manage a network of routers and hubs by pointing, clicking and hyperlinking its way to local and remote configuration databases.

"We are moving our management away from monolithic applications, like HP OpenView, toward Web-based applications," said Allen Robel, senior network analyst for the computer services department at the Bloomington, Ind., school. "We've had OpenView around here for a couple of years and, frankly, we hardly use it."

Among the school's main rea-

See **Net mgmt.,** *page 65*

EVALUATING THE WEB AS A MANAGEMENT TOOL

Strengths	Weaknesses
Ease of use	Security
Familiarity of development environment	Robustness
Ubiquity	Integration with SQL back ends

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Determined but battered IBM in fight of its token-ring life

By Michael Cooney

Raleigh, N.C.

Looking to avoid being left behind in a market that it essentially created, IBM has begun slashing the price of its token-ring switches by about 45%.

Once the undisputed king of token ring, IBM got off to a slow start in the token-ring switch market, shipping its first products in November after missing its summer target date. Failing to show up as even one of the top three vendors on most market share charts, IBM has recently taken to cutting the price of its 8272 Token Ring LAN Switches to as little as $350 per port.

"At $345 to $350 a port, IBM changes the dynamic of the token-ring switch marketplace and brings token-ring pricing

See **Token ring,** *page 64*

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NetworkWorld's *Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.*

News briefs, May 13, 1996

HP takes RISC

Hewlett-Packard Co. will announce a new line of high-end RISC-based servers this week that take advantage of symmetric multiprocessing and, starting in June, will include HP's new PA-RISC 8000 microprocessor. The line will include clustering and massively parallel technology, and tie T series and K series servers together. Amdahl Corp. will also move down the enterprise this week with a line of Pentium Pro-based servers for Windows NT called EnVista.

GO intranet

CompuServe, Inc. this fall will offer an intranet service featuring document sharing, discussion groups and electronic mail supported by Netscape Communications Corp.'s browser and server software. CompuServe will host and manage server farms where users can also house private applications. Users would access the servers over CompuServe's IP network.

What's next?

The beta-test period for Netscape Communications Corp.'s Navigator 3.0 Web browser is not over, but company officials were already talking about Version 4.0 last week at the Fifth International World-Wide Web Conference in Paris. The new browser will have a revamped mail system, new font features and style sheets with standard commands to replace the proprietary extensions that browser makers have incorporated into HTML, according to a Netscape senior product manager. It is targeted for release by year-end. Netscape plans to start beta testing the product late in the third quarter or early in the fourth quarter.

Calypso dances to Seagate

Seagate Technology has made another systems management acquisition, snapping up Manchester, N.H.-based Calypso Software Systems, Inc. for $13 million. Calypso supplies Cabletron Systems, Inc. with a key systems management component of Cabletron's Spectrum platform. Calypso will join NetLabs, Inc., Network Computing, Inc. and Frye Utilities, Inc. in Seagate's Enterprise Management Software, Inc. subsidiary.

Johnny, we hardly knew ye

The pitter-patter of little feet just won't quit at resignation-prone Banyan Systems, Inc. After 11 months of cyclical reorganizations and cost-cutting, Banyan operations guru John Curtis will leave his job as chief of the enterprise networks division to pursue other unspecified interests. Banyan Chief Executive Officer David Mahoney will reportedly take over Curtis' position.

Backing Ipsilon

As expected, Digital Equipment Corp. has acquired a stake in IP switching pioneer Ipsilon Networks, Inc. to the tune of $5 million (*NW*, April 1, page 1). The Digital investment is part of $22 million in new funding Ipsilon secured last week from institutional investors, venture capitalists and other technology partners, including Integrated Device Technology, Inc.

Bullish on multimedia

Merrill Lynch & Co. has partnered with AT&T Solutions, the carrier's outsourcing arm, to build an online electronic commerce system for the investment firm's financial advisors. Using a system of integrated voice, data and video, advisors will reportedly access and respond to financial market data instantaneously. The five-year, $500 million contract also includes migrating Merrill Lynch's private line network infrastructure to AT&T's InterSpan frame relay service, and voice and data network management.

U.S. Robotics cashes in

U.S. Robotics last week said it was awarded a multiyear, multimillion dollar contract from AT&T for dial-up access concentrators. U.S. Robotics' Total Control Enterprise Network Hub will provide users with access to AT&T's Asynchronous Transfer Mode and WorldNet business and consumer services worldwide. U.S. Robotics beat out a host of undisclosed bidders for the pact.

Cabletron unveils Fast Ethernet switch offerings

By Jodi Cohen
Rochester, N.H.

Cabletron Systems, Inc. last week unveiled a collection of Fast Ethernet switch offerings that go beyond the company's current 100Base-T products to allow users to create and manage virtual networks.

The SmartSwitch 100M bit/sec products, all based on Cabletron's new Application Specific Integrated Circuit hardware, will let customers control their virtual nets by using policy-based management techniques and Remote Monitoring (RMON) on a per-port basis.

The full-duplex switching products boast embedded Layer 3 routing, as well as multicast and broadcast storm protection.

The new offerings build on Cabletron's FastNet line of low-end stand-alone and stackable Fast Ethernet switches, as well as the company's ATX switching hub, which was acquired last year from Standard Microsystems Corp.

One user said Cabletron's advanced switching features are important for creating virtual nets.

"We are looking at the Fast Ethernet SmartSwitches to virtually segment our financial, clinical and patient data," said Keith Bush, network administrator at Bayley Seton Hospital on Staten Island, N.Y.

The SmartSwitch 10/100 is a stand-alone switch that combines 14 Ethernet ports with two 100Base-T ports for server or backbone connections.

The 10/100 is designed for workgroups or small backbones that require the same feature set as an enterprise backbone switch.

For Fast Ethernet in the wiring closet or workgroup, Cabletron announced switch modules for the Multi Media Access Center (MMAC) switching hub and Workgroup SmartSwitch products. The MMAC module supports six 100Base-T ports, while the new Fast Ethernet Network Interface Module for the Workgroup SmartSwitch features 100Base-T ports and up to two dual-fiber uplinks for switch-to-switch connectivity.

For Fast Ethernet connectivity at the data center, Cabletron rolled out two modules for its top-of-the-line MMAC-Plus switching hub. The 12-port modules allow as many as 168 separate 100Base-T segments to be switched within a single MMAC-Plus chassis.

All of the Fast Ethernet SmartSwitch modules will be available this summer. Pricing has not been set.

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- Support embedded virtual routing
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- Allow port mirroring using external probes

Bay switching gear blankets networks

By Jim Duffy
Santa Clara, Calif.

Bay Networks, Inc. last week unveiled several new switching products to address diverse requirements at the desktop, wiring closet and campus backbone.

As expected, Bay rolled out Fast Ethernet switching in the form factor of its Distributed 5000 hub and on modules for its Centillion 100 switch (*NW*, April 8, page 6). Bay also unwrapped an Ethernet-to-FDDI module for its System 5000 hub, and a four-port ATM module and LAN emulation software for the Centillion 100 (*NW*, Dec. 11, 1995, page 6).

The new Fast Ethernet and ATM modules are intended to configure the six-slot Centillion 100 into a high-density wiring closet device or ATM campus backbone switch.

See **Bay,** *page 14*

ABEND

abend *(n)* **1:** abnormal end to a computer process **2:** the online fountain of 'Net wit and high-tech humor found on Network World Fusion (www.nwfusion.com).

Top 10 pickup lines for computer geeks

1. Want to see the new hotlinks on my Web page?
2. Are you Mac or PC ?
3. Do you IRC here often?
4. Motorola's coming out with a new PDA — wanna see the specs?
5. Think Justice should break up Microsoft?
6. My OS/2 CONFIG.SYS is flaky — would you take a look at it?
7. Hey baby, what's your URL?
8. Don't you think ATM is overhyped?
9. I've got CU-SeeMe set up at my place — want to check out #hottub?
10. I've got an ISDN PRI connection to the Mbone — let's see how fast we can download alt.sex.*.

by Lee Schlesinger

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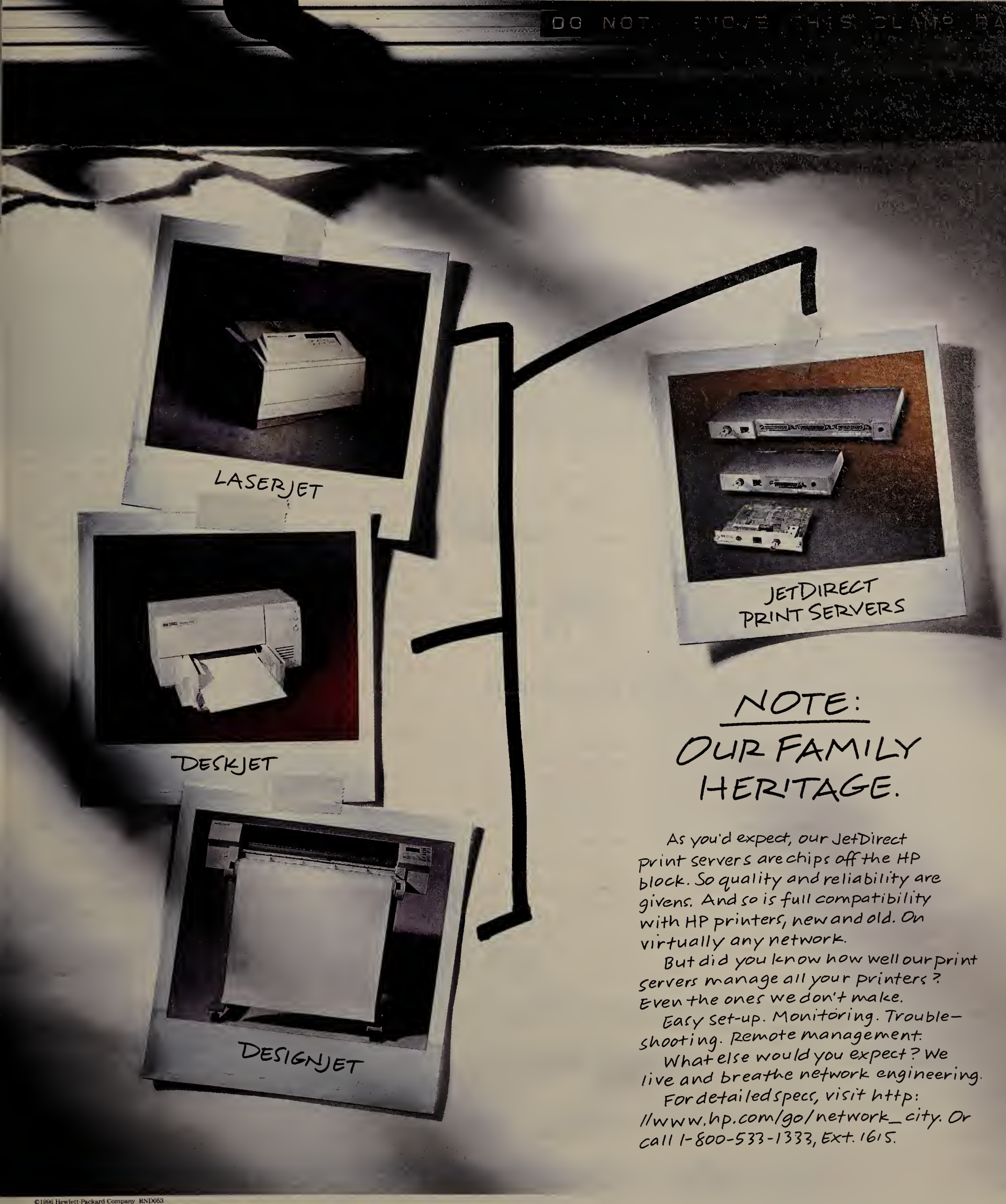

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Vendors relieve 'Net access bottleneck

Ascend and StrataCom interface will let Internet service providers handle more calls.

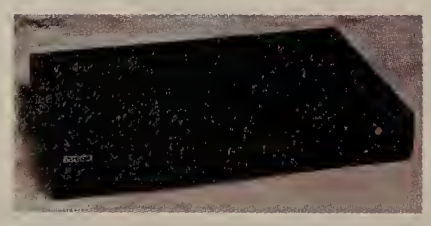
By Jim Duffy
Alameda, Calif.
Ascend Communications, Inc. and StrataCom, Inc. last week introduced an interface for their network equipment that they said will make it easier for companies to provide dial-up intranet and Internet access to more end users.

The jointly developed signalling interface, dubbed the Dial Access Server Interface (DASI), eases network bottlenecks by increasing the call capacity of Internet service provider networks based on Ascend's dial access servers and StrataCom's frame relay and Asynchronous Transfer Mode switches. The interface supports dial-up access over analog and ISDN lines.

"It gives the current [dial access] configuration more scalability," said Tim Burke, communications analyst at The Yankee Group in Boston.

"It's a more efficient use of permanent virtual circuits," he said.

DASI enables dial-up connections to be established dynamically based on the identity of the calling party. This allows all net-



Ascend's *new Pipeline remote access device.*

work users to share a large pool of PVCs and eliminates the current restriction of static nailed-up PVCs, which only allow one customer to connect to a single switch port.

The DASI specification will be offered to other dial access server vendors. Already, Cisco Systems, Inc. and Microcom, Inc. are planning to implement the specification.

DASI, which does not require increased port capacity or other hardware upgrades to the devices on which it runs, will be available in StrataCom's Intelligent Network Server software in the third quarter for $2,000. It will be offered on Ascend's access products as a standard feature.

Separately, Ascend last week rolled out extensions to its Pipeline remote access devices. The Pipeline 75 multiprotocol router features one Ethernet port, two analog ports and an ISDN Basic Rate Interface at a cost of $1,450. The Pipeline 25-Fx includes one ISDN BRI, two analog ports, LAN bridging, and optional routing and data compression for $1,245. The Pipeline 25-Px offers one ISDN BRI, two analog ports and IP routing for $695.

The Pipeline products are available now.

✆Ascend: (800) 621-9578; StrataCom: (408) 294-7600.

Internetworking

AMP says throw the gear in the basement

By Jim Duffy
Harrisburg, Pa.
Electronics giant AMP, Inc. is proposing that users close up the wiring closets on building floors and put all of their hubs and switches in the basement.

No, they are not going out with the trash.

AMP is endorsing a centralized wiring closet strategy that it claims will cut costs on equipment and staffing, ease network management and help take advantage of fiber-optic cabling. AMP makes fiber-optic transceivers, network interface cards and hubs.

"You don't have those intermediate closets to deal with, so you're not going to have a lot of electronics to give you trouble," said Donna Yow, director of technology services for Guilford County Schools in Greensboro, N.C.

"Fiber is much more reliable than [copper] cabling," she said.

AMP's so-called Centralized Network Administration (CNA) strategy centralizes all network equipment — hubs, switches, routers and cable cross-connects — and utilizes fiber for 300-meter runs from the equipment room to the workgroup.

Category 5 copper cabling is usually limited to 90 meters, according to AMP.

At 300 meters, multimode fiber supports data rates of up to 2.5G bit/sec, AMP said. CNA, then, is also intended to provide a migratory step to high-speed infrastructures such as Fast Ethernet and Asynchronous Transfer Mode.

"We feel like this fiber will put us in a position that will be good for 15 to 20 years," Yow said. "We can grow with whatever technology comes out."

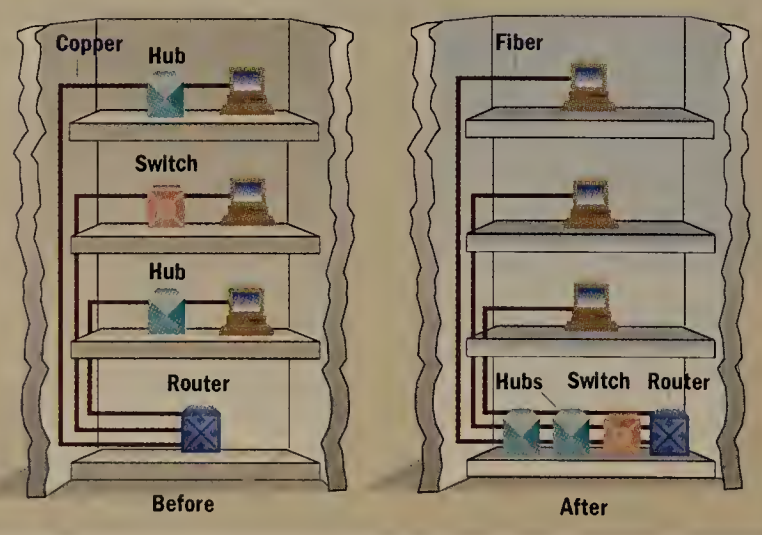
The premium for installing fiber is usually recovered within 12 to 18 months, AMP said. AMP estimates that CNA can deliver an annual cost savings of $175 per end user through reductions in administrative overhead and cable-related network outages.

Guilford County Schools is building a new elementary school featuring a centralized wiring closet with fiber runs to Ethernet hubs in each classroom.

"We're real excited about it," Yow said. "We hope that in the long run, troubleshooting and keeping [the network] running will be a lot easier." ■

Out of the closet

AMP's centralized wiring closet plan can shave equipment and staffing costs off a company's network budget, the company claims.



Apple claims Internet stake with new software

By John Cox
Cupertino, Calif.
Apple Computer, Inc. is expected today to unveil new products and a new direction for Macintosh computers on the Internet.

Analysts expect Apple to elaborate on how three key software technologies — the upcoming Copland operating system, OpenDoc component software framework and Open Transport networking software — will work with the Internet.

Analysts also said they expect Apple to exploit its strength in multimedia tools and reveal plans for supporting multimedia 'Net applications.

Apple is already building OpenDoc credibility. The computer maker will release Version 1.0 of Cyberdog, a set of interchangeable OpenDoc components, called parts, that form an integrated tool kit. The tools are unified through a common user interface for accessing and manipulating Internet information. Cyberdog includes parts for HyperText Transfer Protocol transport, File Transfer Protocol, Gopher, electronic mail and other tasks.

Cyberdog is the largest OpenDoc application ever built and will be a key test for the viability of OpenDoc as a model for building component software applications.

"Cyberdog is Apple's default [Internet] client," said Leonard Rosenthol, director of advanced technology at Watsonville, Calif.-based Aladdin Systems, Inc., the maker of the StuffIt Macintosh Internet file compression software. "But the initial release is limited in the ability [of professional developers] to build upon it," Rosenthol said. Release 1.1 later in 1996 will add a range of features to make this easier, he added.

Apple is well positioned to exploit the Internet, with some analysts estimating that the Macintosh is in fourth place as a Web server platform. ■

Another PCS auction chapter closes

By Joanie Wexler
Washington, D.C.
The Federal Communications Commission auctioned off the remaining blocks of 30-MHz broadband personal communications services (PCS) spectrum last week for a walloping $10.2 billion.

That activity signaled the end of months of bidding for C-block spectrum — 30-MHz frequencies in nearly 500 basic trading areas (BTA) that were available to small businesses. BTAs are subsets of major trading areas (MTA), or larger markets, and often comprise a single city.

The A and B PCS blocks were auctioned off last year to the likes of Sprint Spectrum, PCS PrimeCo L.P. and AT&T for a total of $7.7 billion — giving those superpowers a significant head start on building out their networks, analysts said. Those blocks represented 30-MHz licenses in about 50 MTAs.

The new winners have their work cut out for them, particularly where they won spectrum in only a single city within a state. "The strategies of some of these players will have to be very creative," said Dan Merriman, director of remote and mobile communications at Giga Information Group in Cambridge, Mass.

He said players will have to settle for offering local services in some cases or form close alliances with license holders whose spectrum adjoins theirs.

Consolidation could be stymied because spectrum holders are using several different technologies to build their network services. Two abutting areas would have a difficult time providing roaming services if they used different technologies.

Big winners last week included NextWave Personal Communications, Inc., which won spectrum that reaches more than 93 million people. DCR Communications, Inc. was a distant second with coverage of more than 33 million people.

Still to come: two auctions of 10-MHz spectrum licenses for MTAs and one for BTAs. ■

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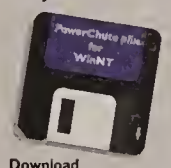

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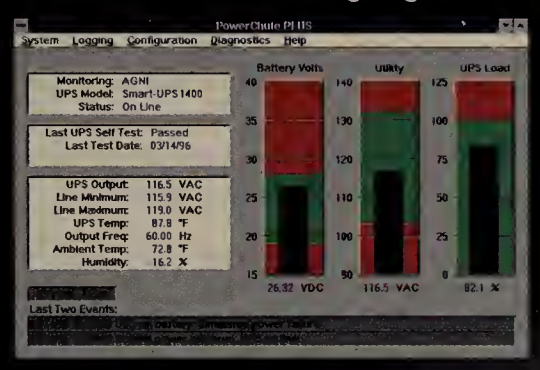

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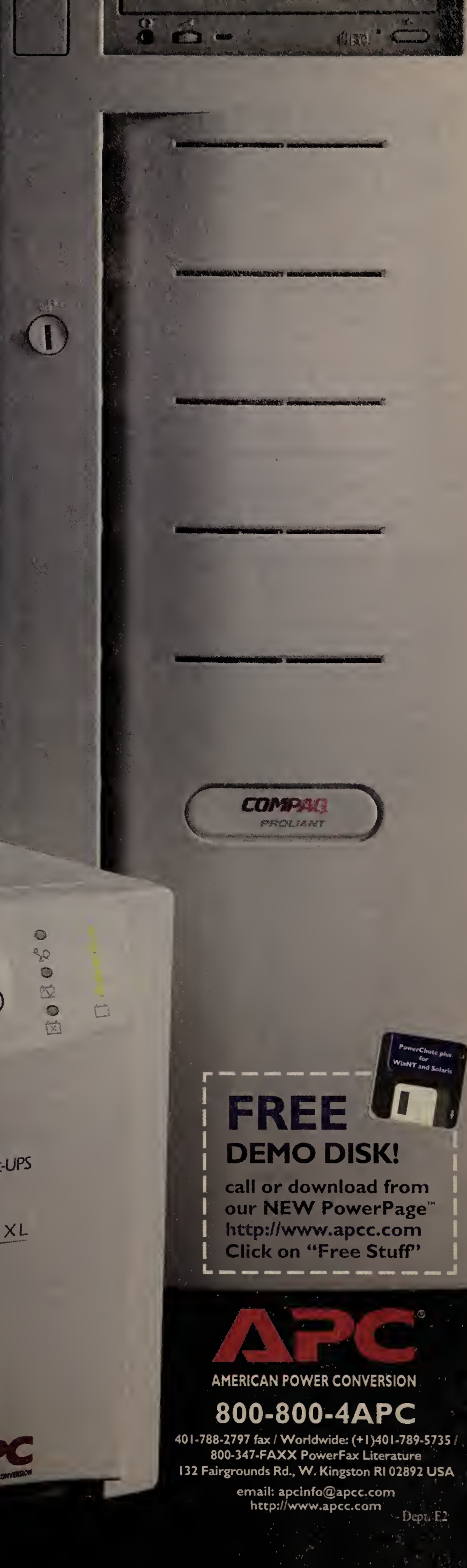

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Dept. E2

Netscape unveils new 'Net commerce offerings

By Carol Sliwa
Mountain View, Calif.

Netscape Communications Corp. this week will bolster its electronic commerce lineup with a new Internet cash register and an electronic wallet. The company is also freshening its current publishing, merchant and community chat forum commercial applications.

The LivePayment online payment processing software, or cash register, will help companies process credit card payments over the Internet. The goal is simplicity. Users set up their storefronts with templates provided by Netscape.

The cash register will be able to take payment information from Internet clients protected with Secure Sockets Layer encryption. Later this year, Netscape also plans to support the emerging Secure Electronic Transactions protocol.

"LivePayment really should streamline the adoption of Web-based electronic commerce by retail merchants of any size," said Bruce Guptill, research director for electronic commerce and Internet strategies at Gartner Group, Inc.

The LivePayment server software is targeted for a third-quarter release on Windows NT and major Unix platforms at a cost of $2,995.

Netscape's new Internet shopping client technology, meanwhile, will provide a uniform interface for World-Wide Web-based purchases. The wallet-like software will be integrated with Netscape's Navigator browser by the fourth quarter.

The Mountain View, Calif., company's electronic wallet will organize a user's credit card numbers, shipping address, digital IDs, coupons, vouchers and any other information needed for buying goods or services over the Internet. It also will store receipts and a transaction ledger to aid with future purchases.

"What this could allow Netscape to do is set standards for Internet wallets that could be stored on smart cards or stored in secure bank servers," Guptill said.

Netscape also plans to introduce new versions of its publishing, merchant and community applications with the following newfeatures:

■ For publishing — open APIs for registration, tracking, text searching and user access control; customized content delivery; support for real-time newsfeeds; and document converters for translating many standard word processing formats into HTML.

■ For the merchant application that allows retailers to create and manage virtual storefronts — support for product and related searching, sales tax and audit reports, discounts and coupons.

■ For the community application that facilitates communication among users with shared interests — an Internet Relay Chat-compliant chat server for replicating content onto multiple Web servers and Netscape Chat 2.0 client software for Windows and Macintosh operating systems.

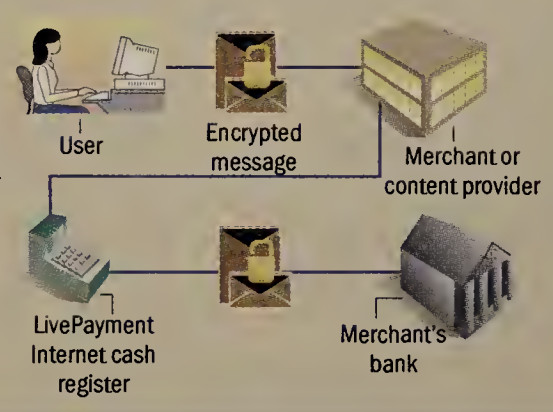
The publishing and merchant systems will sell for $28,000 each, and the community system will cost $10,000. The applications will be available on versions of Unix, including Solaris in June, IRIX in July, AIX and HP-UX in August, and OSF/1 in the fourth quarter.

Also, Netscape has plans for ad manager server software that will rotate and track advertisements over the Internet.

©Netscape: (415) 937-6711.

NETSCAPE'S LIVEPAYMENT INTERNET CASH REGISTER

- Customer fills out an order form that includes payment and shipping information.
- An encrypted message containing that data is sent to the merchant or content provider.
- The LivePayment cash register processes the information and forwards it to the merchant's bank for authorization.



Lucent operating system aims high

By Joanie Wexler
Murray Hill, N.J.

Lucent Technologies, Inc. last week fired up a new breed of networking software that glues together computers, telephones, televisions, cable modems and other devices.

The former AT&T equipment unit said it is ready to license Inferno, a network operating system and development environment for interactive applications running on both private corporate networks and emerging public data networks.

As hot as Lucent thinks it is, the software's ultimate usefulness hinges on industry buy-in — a huge question mark since Lucent has not yet named any licensees.

Nevertheless, the concept of Inferno holds promise. It is the first stab at blending converging services, such as telephony, Internet access and cable television, and comes as carriers begin dabbling in each of these markets. By using Inferno, an application could be written once and then run on everything from smart phones to Unix servers.

"I think of this as 'facileware' because it facilitates creating a service in one source code that is usable regardless of hardware or software," said Peter Bernstein, president of Infonautics Consulting, Inc. in Ramsey, N.J.

For example, an interactive online shopping catalog could work in text mode over a dial-up analog connection, add still pictures of the merchandise over higher speed ISDN links and include video clips over even faster digital cable.

In addition, users could download their electronic mail on their PCs, an airport smart phone or even cable TV in a hotel room, said Bell Laboratories President Dan Stanzione. Bell Laboratories developed the software for Lucent.

The Inferno suite includes a C-like programming language called Limbo, a potential competitor to Sun Microsystems, Inc.'s Java.

Lucent said Inferno will support Java as an alternative programming language.

Inferno can run as a native operating system or as a set of ordinary processes under other operating systems, such as Unix, Windows NT and Windows 95, company officials said.

Lucent has a sales job ahead of it, analysts agreed. "It has to convince the computer world of hardware makers that they should buy this from a company whose heritage is in the communications business as opposed to the computer industry," Bernstein said.

Some were skeptical. "The train has already left the station for Java," said Michael Goulde, senior consultant at Patricia Seybold Group, Inc. in Boston. ■

Adobe sets Internet course

By Carol Sliwa
San Francisco

Adobe Systems, Inc. last week made its Internet splash, outlining a master plan for improving World-Wide Web authoring tools, Web printing and information distribution, and Internet graphics standards.

Bolstering the Mountain View, Calif., company's efforts, Sun Microsystems, Inc.'s JavaSoft division agreed to incorporate Adobe's portable two-dimensional imaging model, code-named Bravo, into its Java programming language. Based on Adobe's PostScript imaging specification, Bravo will give developers an integrated API for creating graphic-rich images that can be displayed the same way on any PC or printer.

"What you need to be a first-tier player is to be a standards setter. . .and the only way [for Adobe] to get its technology accepted as a standard is through licensing agreements," said Ira Machefsky, an industry analyst for Giga Information Group, Inc.

Another step forward is Adobe's agreement with rival Microsoft Corp. to collaborate on a universal font format — called OpenType — that will combine TrueType and Type 1 font technologies.

Adobe also pledged support for Microsoft's ActiveX technology in a forthcoming version of its PageMill Web authoring tool and other authoring products. And it announced plans to develop ActiveX viewers that will let users look at documents without having the original application on the local hard drive.

Yet another deal calls for Adobe to provide customers of AT&T's WorldNet Service with personal publishing capabilities on the Web.

©Adobe: (415) 961-4400.

New HTML gets official stamp

By Ellen Messmer
Cambridge, Mass.

The World-Wide Web Consortium (W3C), the standards body for the Web, last week announced it has finalized a jazzier release of HTML.

Until now, HTML has focused on plain text, but the new version defined in HTML 3.2 has been spiced with a standardized way to view and create tags for tables, centering, a variety of font sizes, floating images and Java applets.

HTML 3.2 is backward-compatible with the plain-text version, HTML 2.0, created several years ago by Web inventor, Tim Berners-Lee.

W3C, which now numbers about 130 members, including Microsoft Corp., Sun Microsystems, Inc., IBM and Netscape Communications Corp., spent several months debating additions to HTML 2.0.

The new version may seem familiar. In fact, HTML 3.2, as defined last week, is already implemented in most of the recent authoring tools, servers and browsers.

The HTML standards path is sometimes hard to follow. For instance:

■ HTML Versions 3.0 and 3.1, which included features for mathematical markup, were never more than discussion drafts, said Dan Connolly, research scientist at the Massachusetts Institute of Technology's Laboratory for Computer Science, which runs the W3C with the French scientific institute INRIA.

■ Math markup did not make it into HTML 3.2, and neither did another hoped-for feature: tags for multimedia objects. But both are targeted for the next HTML release. ■

AT&T freed from international price caps

By Ellen Messmer and Joanie Wexler

The Federal Communications Commission last week ended its regulation of AT&T as a dominant carrier for international services, part of a broader FCC plan to annihilate tariffs and put all carriers on equal footing.

The move will have the most affect on consumers and small businesses. This is because AT&T has already worked with the FCC to streamline the provisioning of telecommunications services from the U.S. to other countries for larger businesses, an AT&T spokesman said. He declined to speculate to what degree the FCC move will affect prices.

AT&T's relief from domestic dominant status last fall has not yet resulted in lower prices; business rates from the carrier and its competitors have actually been rising since the Telecommunications Act of 1996 was signed in February (*NW,* May 6, page 1).

Last week's FCC ruling means AT&T will be freed from price cap regulation. Price cap regulatory schemes have long set minimum and maximum amounts that AT&T could charge for services, requiring the carrier to file reams of cost support documentation.

For now, AT&T and its rivals still must file international tariffs. But these tariffs can take effect on one day's notice, instead of having a two-week or 45-day delay, as has been the case for AT&T.

The commissioners said their decision does not mean that AT&T does not have market power internationally in some instances. Nonetheless, regulation will not solve the problem of high international rates anyway, they said.

They place the blame for these high rates primarily on other countries where there is little competition in international or domestic telecommunications.

The FCC has been pressuring foreign carriers to lower their rates through petitions and trade talks. ■

Bellcore banks on new 'Net offerings

By Tim Greene

Naples, Fla.

Hoping to drum up some new business, Bell Communications Research dusted off some Internet technology it had lying around its research labs and tuned it for commercial consumption.

In fact, the outfit believes it has developed a variety of software, hardware prototypes and services that could change the face of telcommunications services.

Products Bellcore hawked last week at a invitation-only user forum here included software that lets users customize carrier services over the World-Wide Web, security software and software that supports real-time video across the Internet.

The main Bellcore message to potential carrier customers and others was to ride the popularity and ubiquity of the Internet. "In five years, the Internet will have more switching capacity than the public switched telephone network," said George Heilmeier, president and chief executive officer of Bellcore. "It will handle voice, video and data."

With that in mind, Bellcore wheeled out its vision of "IP dial tone," encouraging telephone companies to support IP traffic of all types between the user and the central office.

Bellcore is counting on the fact that more and more users will run applications over IP and will want to run the IP over whatever transport carriers have available: analog, ISDN, frame relay, Switched Multimegabit Data Service or Asynchronous Transfer Mode. These products could come in handy, especially now that the Baby Bells are looking to unload the company. ■

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Solutions for a small planet™

Digital, HP and Tandem cluster around WinNT

By Ben Heskett and Kevin Fogarty

Any worries over Windows NT scaling on Intel Corp.-based machines to meet the needs of enterprise networks are fading fast.

A flurry of activity this month surrounding clustering interconnect schemes and Windows NT scalability plans indicate that Microsoft Corp.'s Wolfpack clustering extensions to NT could rival Unix-based options in the high-volume server space, according to analysts.

Microsoft is shooting to have its distributed cluster version of NT available next year.

The clustering announcements provide "a panacea for those doubts" about NT scalability, said Jim Greene, an analyst at Summit Strategies, Inc., a Boston-based consultancy.

Some upcoming NT-related clustering plans include:

■ Hewlett-Packard Co. will announce on May 29 technology for its NetServer line that will enable one NT server to take over for another in the event of a failure. HP will deliver a middleware layer that runs over NT and is based on MC/ServiceGuard, a tool from the Unix side of HP.

■ Digital Equipment Corp. this week will announce Digital Clusters 1.0, a layer of middleware that runs over NT and facilitates failover clustering on the company's Intel-based Prioris servers and Alpha chip line. The software was designed to be compatible with future NT Wolfpack clustering extensions.

■ A formal alliance announced last week between Tandem Computers, Inc. and Microsoft to include drivers for Tandem's ServerNet message-based clustering technology in Wolfpack extensions. Tandem will also port its database and middleware products to NT.

The deal with Tandem will give Microsoft a shot at customers in the higher reaches of the server market, customers that need higher octane machines than those that currently run NT Server, said Rob Lilleness, product manager for Windows NT.

Microsoft is also working with other high-end server companies, including Digital and HP, to create a standard clustering interface for NT, Lilleness said. The set of APIs would let NT users pick from a range of hardware vendors for server clusters and make installation easier.

"Traditionally, if you look at Unix clustering, it's so complex, you need a team of people to install the system," Lilleness said. "We want to take that complexity completely out of the solution." ■

Price cuts: Making way for the Pentium Pro?

By Ben Heskett

Houston

Hardware engineers aren't the only ones preparing for a new rash of Pentium Pro based servers. Marketeers have been cranking on their spreadsheets, slashing prices on existing Pentium servers to clear out inventories and nab new accounts.

SOMETHING FOR NOTHING

Compaq is offering an additional 100-MHz or 133-MHz processor board free with certain ProLiant 4500s through the end of June.

Compaq Computer Corp. was the latest big name player to cut server prices. Last week, the current leader in Intel Corp.-based server market share announced price cuts of 10% to 15% on Pentium-based ProSignia 300 and ProLiant 4500 configurations.

This action comes on the heels of Dell Computer Corp., which recently cut prices on Pentium-based servers by as much as 34%.

"Clearly, we are positioning ourselves for the introduction of the Pentium Pro systems," said Tejas Vakil, Compaq's director of North American systems marketing. "I think [the cuts are] indicative of the fact that the server market is certainly becoming more competitive."

The pricing battles have been raging for a while. In March, Compaq announced cuts of as much as 10% on ProLiant 1500 and ProSignia 500 configurations.

Digital Equipment Corp., Hewlett-Packard Co. and IBM also recently announced Pentium-based cuts.

Intel's latest chip leads a renewed charge into the enterprise space previously dominated by Reduced Instruction Set Computing microprocessors. ■

Bay

Continued from page 6

The Fast Ethernet switch modules are called 10/100 EtherSpeed. They feature eight 10Base-T switched Ethernet ports for connecting hubs or high-end workstations, and two switched 100Base-TX ports for connecting to servers or other switches. The 10/100 EtherSpeed modules cost $6,995 and will be available in July.

The four-port ATMSpeed modules feature four 155M bit/sec OC-3 ports for server and backbone attachment. Fully configured, the Centillion 100 can serve as a 24-port ATM workgroup and campus backbone switch to compete with the likes of Cisco Systems, Inc.'s LightStream 1010 and Fore Systems, Inc.'s ASX-200.

The ATMSpeed module features a 1.2G bit/sec Application Specific Integrated Circuit for local cell switching at wire speed. Pricing ranges from $8,995 to $12,995. The module will be available in June.

The LAN emulation software, meanwhile, supports autosensing and autotranslation between User-to-Network Interface 3.0 and 3.1 signaling schemes. It will be available in June at no charge.

The FastFrame-based products include the new 28200 switch, which features the same four-slot chassis as the Distributed 5000 hub, and the 58000 Ethernet-to-FDDI module.

The 28200 is designed to provide dedicated 10M bit/sec bandwidth to desktops, switch between shared-media segments and add high-density 100M bit/sec connections in the network center.

It supports 2G bit/sec of nonblocking switching capacity and can be configured with any combination of 10M bit/sec and 100M bit/sec switching modules. They include eight 10Base-T, four 10Base-FL, two 100Base-TX and two 100Base-FX ports. They also include a dual-attach FDDI port and a 400M bit/sec cascade port for connecting as many as seven 28200s for greater port density.

The switch is on

Bay's new switching products include:

- 28200 FastFrame switch
- Ethernet-to-FDDI module for the System 5000
- Fast Ethernet module in the Centillion 100
- Four-port ATM module and LAN emulation software for the Centillion 100

Pricing starts at $2,995, with immediate availability for most features.

"Price is the big thing," said John Dubiel, manager of planning for Boston Edison Co. "They got the price down to a point where it makes moving switching down lower into the network more practical."

The 58000 Ethernet-to-FDDI module for the System 5000 features a dual-attach FDDI interface to bridge Ethernet and Fast Ethernet segments to FDDI backbones. It costs $9,995 and will be available in July.

©Bay: (408) 988-2400.

Server

Continued from page 1

and Tandem Computers, Inc. will be among the other vendors announcing models based on the Intel technology later on this summer. And NeTpower has abandoned RISC in favor of Pentium Pro-based models.

The emergence of these servers has independent software vendors (ISV) excited and ready to offer applications primed for SMP and clustered implementations.

"I think the ISV community has seen the real power of [SHV]," said John McNulty, Intel's director of enterprise programs. "Fear of SMP has pretty much declined to zero [in the PC server space]."

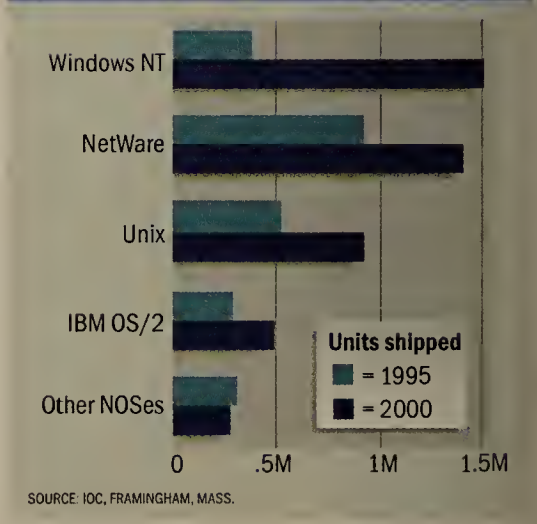
Software vendors such as Computer Associates, Inc., Tivoli Systems, Inc., SAP AG and Oracle Corp., as well as other database vendors, are moving to NT-compatible SMP-enabled versions. As a result, the difference between the performance capabilities of RISC systems running Unix and Pentium Pro SMP servers running NT will blur.

"There is an enormous groundswell of support for NT, and almost every vendor that is doing anything in development tools or databases has announced and/or is already shipping an NT version of their product," noted Dan Kusnetsky, an analyst at International Data Corp., a Framingham, Mass.-based consultancy.

"In the past, there wasn't a lot of reason to have multiprocessor machines because there was nothing that ran on them," said John Brozowski, PC systems manager at United Parcel Service of America, Inc. IT headquarters in Marwah, N.J. "Now it makes more sense."

Currently, NT performance scales almost linearly to four processors before a performance drop-off occurs. NT 4.0, due out in the fall, will scale to eight processors, and a 16-node cluster-enabled version of NT is planned for 1997.

Server operating systems forecast



SOURCE: IOC, FRAMINGHAM, MASS.

But NT still trails Unix. The Santa Cruz Operation, Inc., for example, has two products that scale well to 32 processors.

Users sit up and take notice

On the user side, NT is beginning to gain converts and a lot of interested observers.

Charles McQuade, president and chief executive officer of the Securities Industry Automation Corp. in New York, oversees a high-end Tandem shop that runs the New York Stock Exchange. McQuade just installed Unix workstations and is now turning his attention to NT.

As Tandem and others introduce Pentium Pro-based SMP servers running NT, and further down the road offer clustering capability, McQuade said he is ready to listen.

"As we look at the NT environment ... there's the potential of perhaps duplicating what we've achieved [with Unix and high-end Tandem systems] at less cost and with a broad base of choices with NT," he said. ■

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New price for old GroupWise

By Barb Cole
Orem, Utah

Novell, Inc. may not have new messaging wares like rivals Lotus Development Corp. and Microsoft Corp. do, but it does have one way of generating excitement: good old-fashioned price cuts.

Novell last week revamped the price of its GroupWise 4.1 messaging system, which will result in dramatic savings for small installations, the company claimed.

While the savings are substantial for customers that buy fewer than 100 seats, the savings melt away for companies that purchase more than 250 seats (see graphic).

Novell has historically sold GroupWise components several different ways. Clients were priced per user, but message servers and gateways were priced per site. This scheme made it confusing to determine the overall cost of owning GroupWise and often penalized smaller companies, Novell officials said.

The new pricing model is based on per-user pricing, and runs about $140 per seat. In addition, gateways and servers, which were previously sold as add-ons, will be included in the core messaging package.

"[The GroupWise price change] will be important for smaller companies because they can't negotiate good deals [when purchasing groupware]," said David Marshak, an analyst at Patricia Seybold Group, Inc. in Boston.

Lotus slashed the cost of its Notes Mail client to $55 last December, and Microsoft followed by tagging Exchange clients at $50 to $55 each. ■

A wiser pricing scheme

	25 users	250 users
Old pricing	$12,134	$35,300
New pricing	$3,480	$32,625

Based on GroupWise system with NLM Message Server and one Administration Package.

Microsoft banks on electronic transactions

By Kevin Fogarty
Redmond, Wash.

Microsoft Corp. last week took two important steps toward becoming a power in the new world of electronic commerce.

First, the company announced an alliance of 58 banks that have agreed to use Microsoft's Money personal finance software for their online banking services.

Second, Microsoft outlined how it was going to allow resellers to distribute its products electronically.

Key to the banking strategy is Microsoft's Online Financial Connectivity (OFC) specification, a new method of delivering home banking services. While Microsoft officials said its strategy embraces products from multiple vendors, the company is encouraging the banks supporting OFC to use Money as a front end to applications running on NT Servers.

Microsoft is also working on enhancing its World-Wide Web browser to support automatic teller machine-like transactions across the Internet.

Separately, Microsoft has joined a consortium of vendors aiming to create a clearinghouse that would track software license sales across the Internet. Vendors joining Microsoft in the Electronic Licensing and Security Initiative include Stream International, Inc., First Data Corp., AT&T and IBM.

The goal of the consortium is to create a centralized authority that could track sales of software across the Web.

Until the clearinghouse goes online, Microsoft is outlining the procedure it prefers resellers use when selling Microsoft products online. ■

WANs & Internetworking

Covering: Network Architectures and Management • Routers • Muxes, Remote Access Gear, Modems, PBXs and other CPE • Mobile Computing Products

Briefs

■ **Net2Net Corp.** *last week enhanced its CellBlaster* **Asynchronous Transfer Mode analysis and monitoring equipment** *by adding support for 25M bit/sec ATM. The ATM 25 interface will be available next month. The company also lowered the price of the CellBlaster itself by 25%, to $29,995.*

CellBlaster interfaces — including the 155M bit/sec, 45M bit/sec DS-3 and 34M bit/sec E-3 — also dropped in price, by $17,000, to $5,000.

Net2Net: (508) 568-0600.

■ **IBM** *last week announced Asynchronous Transfer Mode support for its mainframe-based* **Open Systems Adapter (OSA).** *The 155M bit/sec ATM System/390 OSA 2 supports LAN Emulation (LANE) features that enable other LANE-compliant servers to connect directly to the mainframe over ATM services. The OSA 2 will support TCP/IP traffic when it becomes available in August. SNA support will be added in the future. IBM did not announce pricing.*

IBM: (800) 426-2255.

■ **Computer Network Technology Corp. (CNT)** *last week announced it will port its Brixton PU 2.1* **SNA Server gateway** *onto Stratus Computer, Inc.'s fault-tolerant XA/R and Continuum server platforms. The gateway will provide SNA host access for TCP/IP users linked to the Stratus servers. CNT's Brixton PU 2.1 Server will become available on the Stratus products in the second quarter; a 120-session version will cost $39,395.*

CNT: (617) 498-2300.

■ **Radcom Equipment, Inc.** *last week announced that it will implement Ipsilon Networks, Inc.'s* **IP switching software** *into its line of ATM, WAN and LAN analyzers.*

This development will allow Radcom's analyzers to decode packets entering and exiting from Ipsilon's IP Switch ATM 1600 device. The analyzers will ship with the Ipsilon software in July at a price of $4,000.

Radcom: (201) 529-2020.

Candle lights the way

Networks with IBM, MQSeries made more manageable.

By Michael Cooney

Candle Corp. recently enhanced its software package to help users manage distributed network applications that are based on IBM's MQSeries message-oriented middleware.

Candle Command Center for MQSeries has been upgraded to support additional platforms and lets users more easily track the performance, status and configuration of resources in an MQSeries environment.

MQSeries is based on asynchronous store-and-forward communications and enables application-to-application communication over a multiprotocol enterprise net.

Management tools for MQSeries are only now beginning to roll out. Apertus Technologies, Inc., with its MQView offering, is the only other company to provide MQSeries management tools.

"As users roll out bigger MQSeries implementations, Command Center for MQSeries will let them maintain a single repository for MQ objects, configure new nodes remotely and make sure everything's running smoothly," said Dave Powell, director of solutions management for Candle.

Command Center is an MVS mainframe-based package that works by gathering data from Candle agent software on remote devices, storing the information on a central database and presenting the data on a Candle console. Currently, those devices can only be 3270-based, but by the end of the summer, support will extend to the OS/2 and AIX operating systems.

Later this year, Powell said, Candle will also add client support for Windows NT, HP-UX and the Application System/400. Support for products from Digital Equipment Corp., Sun Microsystems, Inc. and Tandem Computers, Inc. are also planned for the future. Also, according to Powell, the company is working on a Command Center offering that is not based on an MVS mainframe.

In addition to supporting

See **Candle,** *page 18*

Remote access vendors say faster is cheaper

By Jim Duffy

Two remote access vendors have unveiled new products in an effort to bring low-cost, high-performance networking to branch offices.

Develcon Electronics, Ltd. brought out a central-site frame relay access concentrator (FRAC) that provides access to the corporate LAN for multiple remote sites. And Stampede Technologies, Inc. unwrapped remote node accelerator software that reduces connection time between remote and central sites.

The products are intended to address some of the end-user demands that are causing the remote access market to explode. Indeed, branch office routers are the fastest growing segment of the router market, accounting for $1.4 billion of the $4 billion in router sales for 1995, according to Dataquest, Inc., a research firm in San Jose, Calif.

With that thought in mind, Develcon announced the Orbitor 4000 central-site FRAC, which supports a single Ethernet attachment and two T-1/E-1 links, and can route IP and IPX protocols.

The FRAC features 6-to-1 data compression per permanent virtual circuit and Forward Explicit Congestion Notification/Backward Explicit Congestion Notification-compliant congestion control. Ethernet media access control-layer and spanning tree bridging are provided for non-

See **Remote,** *page 18*

Branch office access router market breakdown

Company	Units (in thousands)	Revenue (millions of dollars)	Revenue segment share (%)
Cisco	247.53	895.68	62.7
Bay	38.74	105.89	7.4
3Com	35.46	101.71	7.1
Digital	22.33	95.79	6.7
ACC	14.90	36.43	2.6
HP	9.94	29.87	2.1
Hypercom	8.37	30.89	2.2
Ascom Timeplex	8.54	26.70	1.9
CrossComm	2.35	10.54	0.7
Develcon Electronics	1.57	3.10	0.2
Gandalf	3.13	5.34	0.4
Network Systems	0.75	2.70	0.2
Others	48.45	83.57	5.9
Total	**442.06**	**1,428.21**	**100.0**

SOURCE: DATAQUEST (MARCH 1996)

Management firms add capabilities to popular systems

By Jim Duffy

The systems management product arena has seen a flurry of activity, and it doesn't seem ready to stop any time soon.

In a recent announcement, FS Integrators, Inc. unveiled the Service Order Module, which expands the functionality of Remedy Corp.'s Action Request System help desk software.

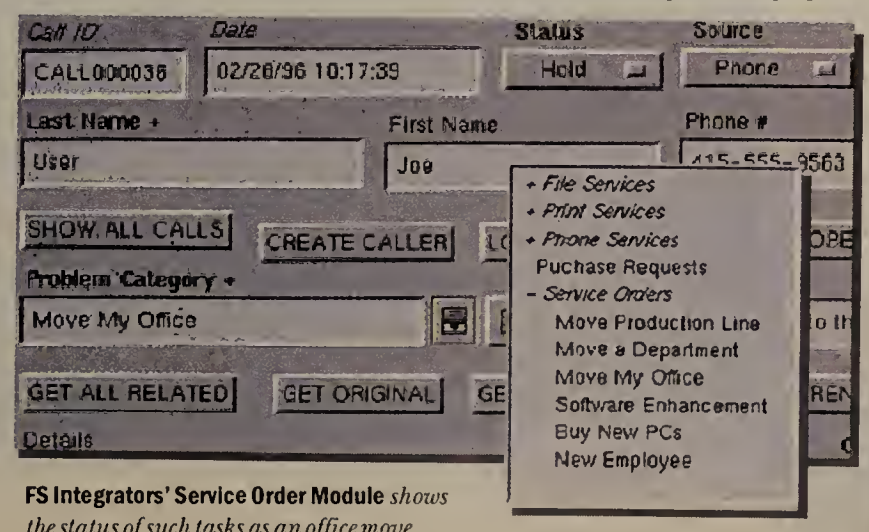
Also, ISA Corp. has debuted a version of its AppWorx job scheduling product that runs on Windows NT.

FS Integrators' Service Order Module allows Remedy's widely installed ARS to process, monitor and control complex requests, said Stan Feinstein, principal of FS Integrators. Currently, ARS cannot conduct job scheduling of multiple change-management functions such as moving users or updating software, Feinstein said.

"One of ARS' major deficiencies has been [its] inability to step up to the task of change management," said Bill Keyworth, research director for network and systems management at Gartner Group, Inc. in Stamford, Conn. "Within the last six to nine months, our client base has included change management as one of the most frequent [requirements]."

Requests such as facility moves, staff additions, or large acquisitions and installations involve multiple tasks that are performed in parallel and have predecessor/successor relationships. The FS Integrator Service Order Module manages the relationship of these tasks by providing templates that allow the initiator of the request to check on its progress and that let the recipient prepare for the work-

See **Management,** *page 18*



FS Integrators' Service Order Module *shows the status of such tasks as an office move.*

Remote

Continued from page 17

routable protocols, and the FRAC can be managed via Simple Network Management Protocol or telnet.

The $3,995 FRAC is available now.

Stampede's OverDrive software is a client/server package designed to increase performance of file-system applications over a remote node connection. It does this by reducing the traffic and increasing the bandwidth on a remote access link.

OverDrive Server Verifier software runs on NetWare and Windows NT servers. OverDrive Client software runs on Windows 3.X and Windows 95 workstations, and dynamically finds the OverDrive Server Verifier once an IPX connection is established. "Keep alive" packets are not required to maintain the connection, Stampede said.

"We're seeing a move among corporations now to recognize remote access as an enterprise issue," said Rick Villars, director of network management research at International Data Corp. in Framingham, Mass. "Once it became an enterprise issue, users became much more sensitive about how to increase performance, enhance communication and reduce connect times."

OverDrive will compete with AirSoft, Inc.'s Powerburst software, which has the support of some 17 networking vendors, including Ascend Communications, Inc., Cisco Systems, Inc., Shiva Corp. and Telebit Corp.

OverDrive client software, available now, ranges from $119 to $7,995. The server component costs $295 to $4,995.

✆Develcon: (306) 933-3300; Stampede: (513) 291-5035.

Candle

Continued from page 17

new platforms, the enhanced version of Command Center will automatically gather configuration information from distributed devices and monitor the performance of remote queues.

Command Center for MQSeries competes most closely with Apertus MQView, a stand-alone Simple Network Management Protocol-based management package that runs on Windows NT.

"Candle includes the Command Center console functionality plus integrated mainframe support so it may be a more intriguing product for mainframe users than the stand-alone Apertus MQView system," said Paul Mason, research director for enterprise systems management at International Data Corp. in Framingham, Mass.

Pricing for Candle Command Center for MQSeries starts at $25,000.

✆Candle: (800) 843-3970.

Management

Continued from page 17

load (see graphic, page 17).

The Service Order Module runs alongside ARS on Sun Microsystems, Inc., Hewlett-Packard Co. or IBM Unix-based workstations, and Windows NT servers. It costs $10,000 and is available now.

ISA, meanwhile, has become the latest systems management vendor to endorse Microsoft Corp.'s popular Windows NT platform. AppWorx brings the same client/server job-scheduling capabilities to NT that are usually associated with the Unix world.

NT support will be rolled out in two stages: Next week, ISA will unveil AppWorx agents for NT, and in mid-August, it will release AppWorx "masters," or management consoles.

According to ISA, this master/agent architecture enables cross-machine job dependencies across heterogeneous networks.

Each Unix or NT master can oversee the duties of agents, regardless of whether those agents run on Unix or NT hardware.

AppWorx for NT masters costs $12,000 and agents cost $7,000.

✆FS Integrators: (310) 581-3555; ISA: (206) 644-2121.

INTERNETWORKING MONITOR

Scott Bradner

Thinking local in global world

We seem to be getting a rash of local attempts to regulate the global Internet. Everyone seems to be getting on the bandwagon, from states telling us what DNS names are OK, to national governments trying to regulate content.

There is just something about technology that seems to attract regulation (or taxation) attempts like bears to honey.

Some of the efforts are quite silly, such as a state trying to control what user, machine and domain names can be used: "Don't you use no bad words now." Other efforts, such as the current attempt to ban the use of Internet-based telephony, are futile and give the impression of King Canute commanding the tide not to come in and getting wet in return. And some of the efforts are scary, such as the ban on the use of encryption in some countries.

There are dozens of other examples, from the U.S. Communications Decency Act attempting to protect the world from what a 7-year-old should not see, to the InterNIC's U.S. trademark-based conflict resolution processes for global domain names.

A feature of the Internet, just like the telephone network, is that it crosses jurisdictional boundaries, intracountry as well as intercountry. This makes it hard for those who would attempt control. Blaming the Internet service provider for naughty pictures delivered over the 'Net is like that Tennessee prosecutor who blamed the local telephone company for the dirty pictures he downloaded from California.

A number of people are starting to think seriously about how to deal with the cross-boundary nature of the Internet.

In my last column, I expressed a belief that a little anarchy is a good thing, but the anarchy has to be at the right level and have the right impact. Just as anarchy in the creation of top-level domains seems more than a bit counterproductive, anarchy in rule making will not be helpful.

There are existing international forums that some are beginning to suggest as reasonable home bases for rule making for parts of the Internet. In particular, the International Telecommunication Union (ITU) (http://www.itu.ch), a treaty-based organization in Geneva, looks like a likely candidate. I expect that the idea that some body in far-off Geneva should have any role in anything to do with the U.S. part of the Internet seems far-fetched to many of the current crop of Internet service providers.

But a few observations: On the Internet, Geneva is not all that far away—about as far as the person in the next cube. In light of the fun the InterNIC has been having with lawyers and domain names, an international treaty organization has its attractions.

If desire for top-level domains is met, the increasing desire for new global, top-level domains also increases the need for an international dispute resolution process. Most importantly, though, this Internet thing increasingly will become something that is brought to the customer by existing telephone companies, and the telephone companies are accustomed to dealing with organizations like the ITU.

I'm told Geneva is a nice place to visit. I'm beginning to think that I, as well as others in the Internet biz, will be finding out.

Disclaimer: With sites like the one it has in Florence, Italy, Harvard is international, but it does not defile telco regulations, so the above Geneva premonitions are mine.

Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.

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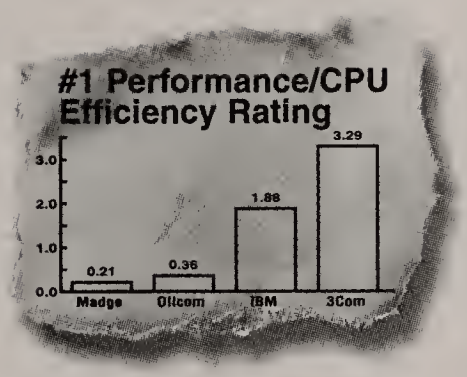

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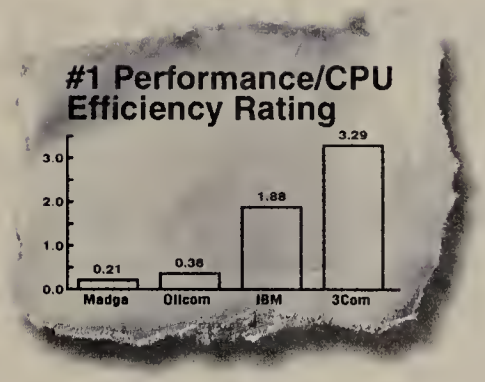

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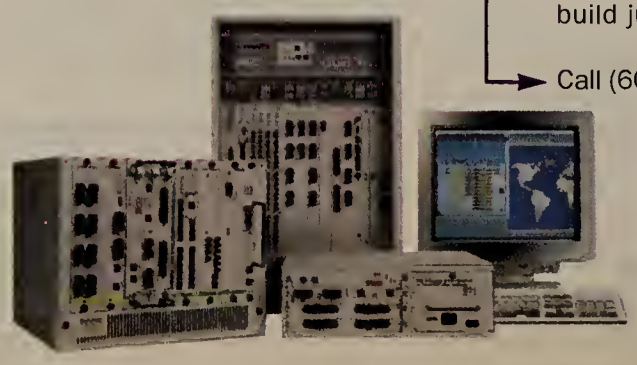

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IDC INSIGHT

SPECIAL ADVERTISING SUPPLEMENT

AN INDUSTRY UPDATE WRITTEN BY INTERNATIONAL DATA CORPORATION AND SPONSORED BY NOVELL, INC.

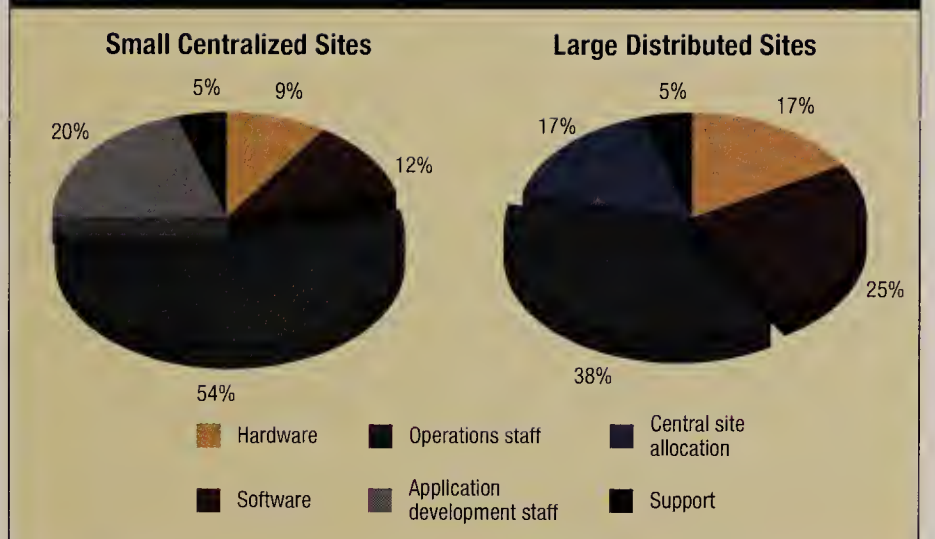
Meeting the Challenge of Client-Server Computing

Maximizing Return-on-Investment of Network Computing

The migration to client-server computing is affecting organizations both large and small almost everywhere on the planet. Computer users today have extensive access to global network-based resources, including communication gateways to other companies, individuals, and markets worldwide. Signs of this connectedness abound:

- Last year the number of LAN users worldwide hit nearly 100 million, double the number in 1993. By 1999 the number will double again
- In the same year the number of people in the world with electronic mail boxes topped 40 million. By 1999 the number will be over 125 million
- Groupware users numbered over 30 million worldwide by the end of 1995; by 1999 they will number over 250 million

Figure 1 — The Hidden Costs of Client-Server



Source: International Data Corporation, 1996

So we are heading for a wired workplace, a wired marketplace, even a wired society. However, there is a price to be paid for all this connectivity. The nearly universal implementation of client-server systems requires living with new levels of complexity and new hardware and software that people must be trained to use. Moreover, highly skilled personnel must be hired to install, manage, maintain, and administer these far-flung networks. The result is that staffing costs have become the largest contributor to total networked computing costs, regardless of the size of the installation (see Figure 1).

Until now, companies have justified the costs and complexities of client-server computing by competitive advantage–it is a very flexible and adaptable computing style. But when client-server is the norm, where will the competitive advantage lie?

IDC believes that companies that learn to manage their networked resources through technology and training will win out over their peers in the long run. Companies that understand the true costs and true benefits of client-server computing will generate quicker return for their investments. Companies that relentlessly optimize, integrate, and upgrade existing systems will stretch IT resources further and be able to reinvest sooner than competitors taking a wait-and-see approach.

Areas of Opportunity

IDC and Novell have teamed to produce this White Paper in order to help IT managers develop a strategy for maximizing return on investment in networked computing resources. It is the executive overview of three studies researched and written by IDC and sponsored by Novell. In the research it conducted,

Driving Down Networking Costs

GroupWise:

Typical annual return-per-user of 334%

Nearly $400,000 a year saved in phone costs at Farmland Foods

Courier costs cut $16,000 a year at Sheppard, Mullin, Richter & Hampton

NetWare 4:

On average 15% less expensive than NT Server from Microsoft

50% increase in users supported by a single server

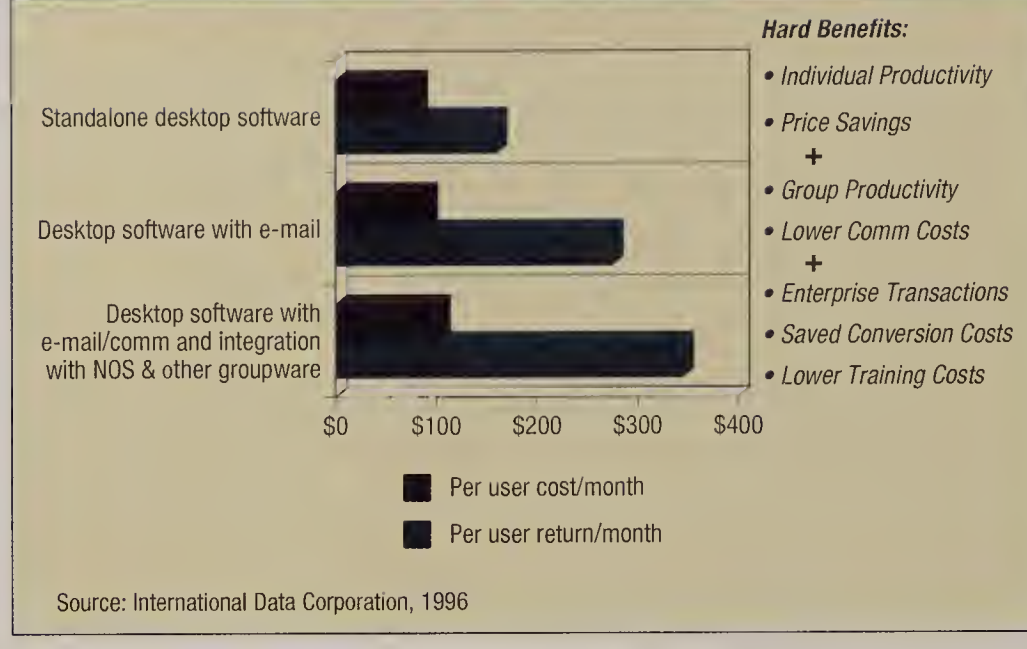
ManageWise:

$95,784 savings in business efficiency per 100 users

50% reduction in network downtime

19.7 day payback

Figure 2 — The Investment Leverage from Groupware



Source: International Data Corporation, 1996

IDC found three areas of networked computing that are focal points for ROI leverage:

1. The choice and use of communication applications such as e-mail and groupware
2. The choice and use of next-generation network operating systems
3. The use of advanced network and system management tools

In addition, IDC found that when products in support of all three of these areas work together in an integrated fashion—such as Novell's GroupWise, NetWare 4.1, and ManageWise products—benefits are compounded. Support and training costs are lower, conversions and upgrades occur faster, applications come on stream sooner, and downtime is reduced.

Applications for the Next Wave

The migration to client-server computing is a quest to provide users with access to information and computer resources beyond their desks. One of the key tools for this is groupware software, epitomized by Novell's GroupWise, software which integrates e-mail with scheduling, calendaring, and other workgroup oriented functions. The market for groupware is exploding as organizations find they can use it—specifically the e-mail function—as a platform for providing workgroup and even enterprise-wide access to information and resources.

In the research IDC conducted, almost half of the business benefits organizations received from migrating to groupware came from better internal and external communications. For instance, Farmland Foods, a $2 billion dollar meat processing company, found that since installing GroupWise, documents once faxed in 15 minutes now take less than five to e-mail. Further, the use of GroupWise saved almost $400,000 in voice phone calls a year.

Figure 2 illustrates how electronic communication and collaboration generate cascading benefits. Standalone desktop software can impact individual productivity, but when combined with e-mail, that software can improve the productivity of a whole workgroup, not just the individual user. If the e-mail is specifically designed to work with the desktop software and with the network software, as say Novell's GroupWise is with NetWare 4.1, then those workgroup benefits are compounded.

This efficiency pays real dividends. When Sheppard, Mullin, Richter & Hampton, a Los Angeles law firm, made the move to GroupWise it found the support ratio for lawyers dropped from one assistant for every two lawyers to one for every three. GroupWise scheduling cut countless hours in tasks as routine as setting up meetings; GroupWise e-mail cut courier costs by $16,000 a year.

For most companies, an investment in groupware is considered an incremental cost. The hardware is already in place, as is the network. Moreover, the support costs—which account for more than 50% of the cost of operating a networked PC—are shared across dozens of applications.

But even with all the hardware, network, and support costs amortized across the groupware software, it's a bargain. IDC's research with Novell's GroupWise customers found that a typical installation required only about $250 in fully-loaded first-year costs—less than 5% of the annual cost of operating and supporting an end-user personal computer.

For that $250 investment, those same GroupWise customers found that their first-year return was over $800 on lowered communication and clerical costs alone. Meanwhile, they accrued an array of other concrete benefits, such as fewer meetings (and thus less travel and meeting administration), easier document handling, and so on. For every single GroupWise customer interviewed by IDC, return-on-investment exceeded expectations.

Modernizing the Network

If the LAN is the heart of client-server computing, then the network operating system is its soul. As LANs have evolved from peripheral information systems to the primary components of mission-critical systems, they have become more robust and more scalable. Along the way they have also provided IS personnel with the tools to manage network resources as never before.

In fact, powerful new management capabilities are why many people are migrating to NetWare 4.1. With more than 375,000

licenses installed worldwide as of 1995, it is the most popular network operating system. Three key reasons for its popularity are:

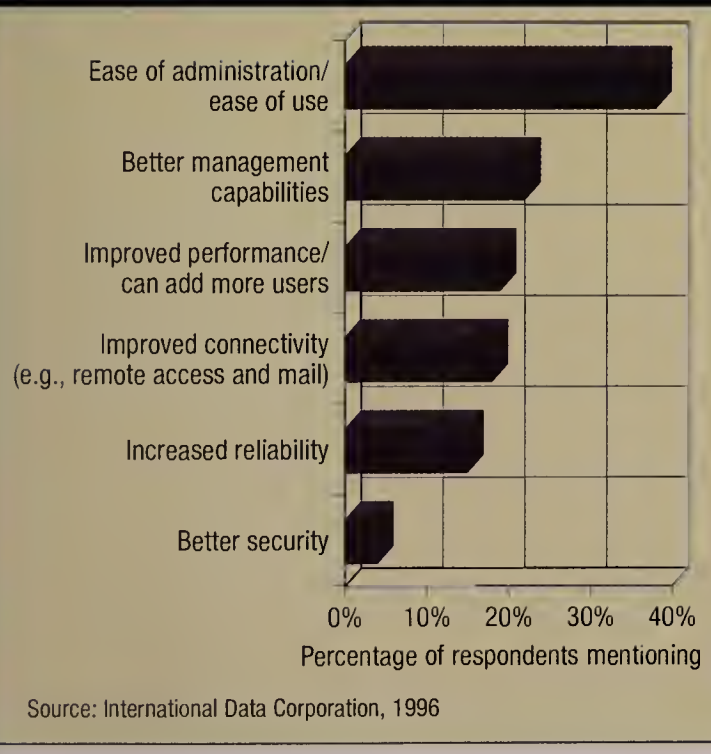
- Greater functionality
- Improved management
- Directory services

Figure 3 illustrates how survey respondents believe migrating to NetWare 4.1 has enhanced network productivity—with ease of administration at the top of the list, mentioned by nearly 40% of respondents. NetWare 4.1's greater functionality has promoted companies' reliance on LANs and delivered on the ultimate promise of client-server—increased productivity.

According to recent surveys conducted by IDC, LAN managers report remarkable improvements in managing their networks under NetWare 4.1. Although they expected the number of nodes on their networks to grow by 260% in the 12 months following installation, they anticipated the number of file servers on the network would grow by only 163%. In other words, under NetWare 4.1, they expect to increase the ratio of users per server from 41 to 60—an improvement of 50%.

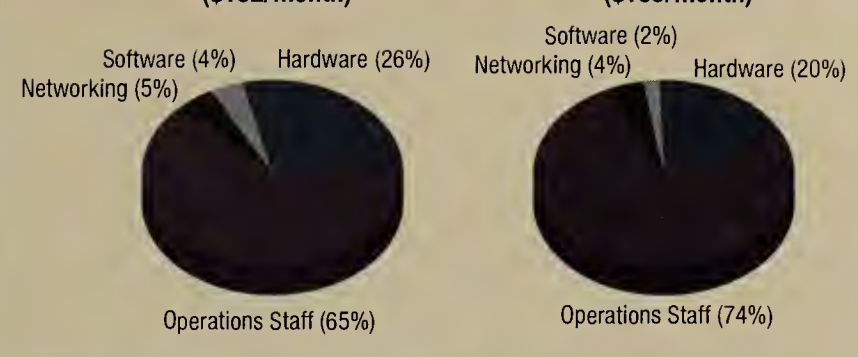
In addition to increasing the number of users per server, NetWare 4.1 provides a single point of administration with Novell Directory Services (NDS) that results in a lower cost of network administration. Figure 4 shows how, in medium-sized sites, NetWare 4.1 generates 14% lower network administration costs than Microsoft NT, primarily by increasing the user to support staff ratio.

Figure 3 — How NetWare 4.1 Improves Network Productivity



Source: International Data Corporation, 1996

Figure 4 — Network Cost-to-Use at Medium (300 User) Sites (Costs After Migrating from NetWare 3.X)



Source: International Data Corporation, 1996

Novell and other networking companies have set their sights on developing new technologies that will make tomorrow's networks more efficient and flexible. Novell has developed a Smart Global Network strategy, which entails making the network available to anyone—anytime, anywhere. An essential component of the Smart Global Network is Novell Directory Services (NDS), which enables companies to keep track of and connect all of a network's users, workgroups, hardware and software on one common access and administrative framework. NDS provides directory services technology that can handle the management of countless resources on heterogeneous systems spread around the globe. Also fundamental to Novell's vision of the future is an open set of application programming interfaces (APIs) that will make it easy to incorporate NDS and other NetWare 4 networking services into distributed applications.

Providing End-to-End Network Management

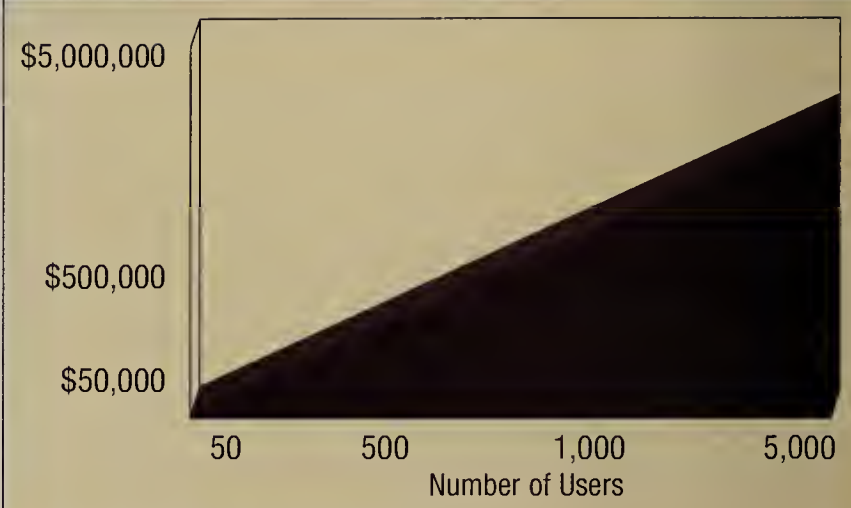
Staffing costs and end-user productivity are the issues that keep IS managers awake at night. And that has never been more true than it is today. As networks expand and intertwine, the critical success factors for network managers will include:

- Increasing network uptime, both in operation and when installing new users or applications
- Increasing efficiency by supporting rapid network growth without commensurate growth in staff
- Increasing responsiveness, fixing problems in a way that minimizes idle time for users or within business processes

To meet these needs, Novell offers ManageWise. It combines both network management and PC administration into a single, integrated package. Previously, most PC administration and LAN management products worked independently of one another, each requiring dedicated staff and resources.

ManageWise is the integrated solution that offers a single view of the network. It provides analysis tools for understanding bottlenecks; permits the configuration, inventory, and diagnostics of PCs from a single local or remote site; and provides tools for monitoring and managing remote and local servers. IDC's research demonstrates that even small and medium-sized companies can achieve significant cost savings by implementing ManageWise (see Figure 5). Network managers found that the most significant gains in efficiency were realized in server operation and help desk functions. Using ManageWise also increased LAN manager responsiveness. Before implementation, only 30% of network or end-user problems could be solved from a central site; afterwards, that number rose to 60%. This is especially important for companies with highly decentralized operations.

Figure 5 — Average Annual Savings From ManageWise



Source: International Data Corporation, 1996

Since the software-licensing, maintenance, and training costs of a product like ManageWise are low compared to the number of users potentially affected, the return on investment can be surprisingly high. Across the survey base polled by IDC, ManageWise paid for itself on average within 19.7 days.

For every 100 users, implementing integrated management with ManageWise saved $95,784 annually. These savings are attributable to the following:

- More efficient systems management, including an increase of 33% in the number of servers and 25% in the number of PCs a staff person can support, and a decrease in travel of 53%, leading to annual cost savings of $14,500
- Significant reductions in the time required to perform key management tasks—such as five hours in moves and changes, nine hours in server maintenance and configuration, seven hours in help desk and support, four hours in problem tracking, three hours in printer maintenance, etc.—saving $30,844 annually
- Dramatic reductions in network downtime (over 50%) due to network outages, delays addressing problems at the desktop, or time spent installing and configuring applications, generating annual savings of $50,440

Cost-Savings and Client-Server: They Aren't Mutually Exclusive

Believe it or not, return on investment in networking can be quantified. While it may sometimes seem that networks are growing out of control, vendors like Novell are in fact working diligently to develop products for simplified, easily managed local, wide-area, and global networks. Because of the strategic and financial advantages of networking wherever systems reside and users roam, organizations will be forced to expand the reach and complexity of their networks simply to remain competitive.

Astute companies will concentrate on migrating to client-server computing in ways that maximize both the resources available to run networks and the effectiveness of those who ultimately generate revenues and profits—namely, end users.

Call to Action

This is an executive overview of a three-part series of White Papers entitled:

- Novell GroupWise: Leveraging Desktop and Network Investments
- Novell NetWare 4.1: Reducing Cost of Ownership
- Novell ManageWise: Maximizing Returns on Networking Investments

For a free copy of the Novell Business Advisor containing tools that help you assess return on investment with NetWare, MangeWise, and GroupWise, as well as electronic versions of the IDC White Papers, call 1-800-665-4586 or visit either the Novell home page at http://www.roi.novell.com or the IDC home page at http://www.idcresearch.com

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Briefs

■ **Interphase Corp.** *of Dallas last week rolled out a line of* **25M bit/sec Asynchronous Transfer Mode adapters** *for workstations and servers. The adapters, designed for desktops running multimedia applications, will support full-duplex, 25M bit/sec ATM connectivity. They can be used in PCI-, EISA-, ISA-, Micro Channel Architecture- and SBus-based systems. Pricing for the adapters starts at $345, and all products will be available by this summer.*

Interphase: (214) 654-5000.

■ **Micro Design International, Inc. (MDI)** *will announce a* **CD-ROM server** *this week for Ethernet LANs. CD-Express Connect can be installed and configured as a NetWare or Network File System server without drawing processing resources from existing servers. CD-Express Connect is available in a seven-drive tower or as an upgrade to existing MDI devices.*

The product includes Express Admin CD-ROM administration software, and a standalone model is available for $995.

The CD-Express Connect miniserver and seven-drive tower are priced at $3,895. The product ships later this month.

MDI: (800) 228-0891.

■ **Remedy Corp.** *will announce* **change and asset management** *additions to its Action Request System help desk application. The Change Management application allows an administrator to track network changes, while the Asset Management application tracks what is connected on a network and integrates with Microsoft Corp.'s Systems Management Server and Tally Systems Corp.'s NetCensus. They include samples of the company's graphical tool that displays historical and real-time network change data.*

The applications will be available in June and are priced at $500 per user.

Remedy: (415) 903-5200.

Xylan revs up flagship OmniSwitch

By Jodi Cohen

Xylan Corp. last week pumped up its flagship OmniSwitch chassis with a new switch engine and modules that make the device more powerful and cost-effective than many competing superhubs, analysts said.

As expected, the new SuperSwitch modules allow customers to switch between multiple media types, route IP and IPX traffic, and create enterprise-wide virtual LANs (*NW,* April 29, page 11). In addition, the cards boost the port density of the OmniSwitch so it can support as many as 96 switched Ethernet and 48 token-ring segments. The original version supported a maximum of just 64 dedicated LAN ports.

SUPERSWITCH MODULES FOR OMNISWITCH

Product	Pricing
12-port Ethernet switch	$5,450
8-port Ethernet with fiber connectors	$6,950
4-port Fast Ethernet	$6,750
8-port Fast Ethernet	$8,950
6-port token-ring with fiber connectors	$10,950
FDDI switch with one dual-ring link	$10,950
FDDI switch with two dual-ring links	$16,950

SuperSwitch modules include Ethernet, Fast Ethernet and FDDI cards.

Key to the OmniSwitch performance boost is Xylan's High-speed Switching Module, a 14G bit/sec engine that switches among the modules in the chassis. By supporting such a powerful switch engine, OmniSwitch can run sophisticated software that supports built-in routing and complex VLANs.

"This is the leading edge of a trend where more power is built into the switch," said Frank Dzubek, president of Communications Network Architects, Inc., a consultancy in Washington, D.C. "This allows Xylan to build flattened nets by creating software-enabled VLAN environments that span across switches."

Traditional superhubs — such as 3Com Corp.'s ONcore, Bay Networks, Inc.'s System 5000 and Cabletron Systems, Inc.'s Multi Media Access Center-Plus (MMAC-Plus) — have a backplane through which the modules communicate via a shared-bandwidth engine as opposed to a switch.

Dzubek pointed out that because the box is based on a completely switched architecture, the OmniSwitch has a lower price per switched Ethernet port — $573 — than the Bay 5000's $2,222 or the Cabletron MMAC-Plus' $1,672, he said.

The new modules can support VLANs based on media access control (MAC) addresses, protocol types, IP subnets or IPX networks. In addition, the modules support built-in Remote Monitoring and port mirroring capabilites. The switch also has redundant logic on the boards for increased reliability.

Switching to SMC

In other LAN switching news, Standard Microsystems Corp. (SMC) last week rolled out two workgroup Ethernet switches to help relieve network congestion.

SMC's EZ Switch Plus provides six 10M bit/sec Ethernet ports and two 100M bit/sec Fast Ethernet links for connection to hubs, servers and power users. The device supports as many as 4,000 MAC addresses and operates in cut-through mode.

SMC also unveiled its TigerSwitch XFE, which provides 16 10Base-T ports for hubs and servers and one 100Base-T Fast Ethernet port for connection to a backbone or server farm. The store-and-forward switch, which can support up to 16,000 MAC addresses, is designed to sit atop SMC's popular TigerStack hubs.

The EZ switch is priced at 2,000 and the TigerSwitch costs $3,400. Both are available now.

✆Xylan: (818) 880-3500; SMC: (800) 992-4762.

Landmark to monitor NT performance

By Kevin Fogarty
Vienna, Va.

Landmark Systems Corp. is preparing to ship products designed to let net managers track what is going on within Windows NT Servers.

The products are a set of intelligent agents that track hundreds of performance metrics on both NT and SQL Server databases. The agents then feed that data to a management application that can graph the current status of a server or store performance histories for capacity planning, according to Richard Spangler, product manager for Landmark's NT product line.

The PerformanceWorks/Smart Agent for NT Server monitors 800 NT Server metrics and the PerformanceWorks/Smart Agent for SQL Server tracks about 200 metrics, he said.

The PerformanceWorks/Domain Station management console collects data from the agents.

The level of detail the products deliver is at once a benefit and a potential risk, said Sylvia Clark, an analyst at Aberdeen Group, Inc. in Boston. Net managers could lose the forest for the trees, she said.

See **Landmark,** *page 27*

Intel empowers desktop users

By Ben Heskett
Santa Clara, Calif.

Intel Corp. will unveil a new management application this week that gives desktop users and administrators the ability to diagnose hardware and software problems in PCs.

The new software, LANDesk Client Manager, allows an administrator or PC user to inventory the contents of the PC, receive alerts when memory or hardware problems occur and get updated information of files based on periodic checks by the software.

If memory use is high or a hardware component is showing signs of failure, the desktop user will receive an alert. A user can also proactively check the contents of the PC.

Client Manager supports Windows 3.X, Windows 95 and Windows NT clients, and runs over IP and IPX protocols. It is Desktop Management Interface (DMI)-compliant, so any management application following the Desktop Management Task Force spec can get alerts from the client-based product.

Analysts said the new LAN-Desk application will complement, not overlap, existing LAN management products.

"You can roll this into a management-type application, and that's where a lot of organizations want this type of information," said Kurt Schlegel, an analyst at META Group, Inc. in Stamford, Conn.

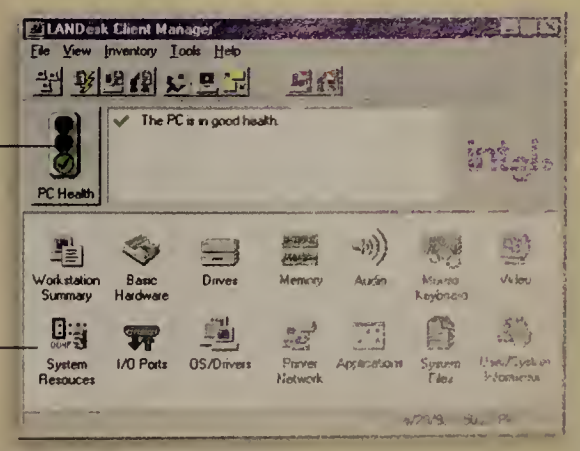
✆Intel: (800) 345-1518.

LANDESK CLIENT MANAGER

Users can diagnose problems with their PC using LANDesk Client Manager.

The software, which will be built into Intel-based PCs, enables end users to diagnose PC problems. A green or red light indicates to the end user whether a PC component is running efficiently.

Icons allow an end user or administrator to drill down into the PC for different readings such as temperature.



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Server roundup

Sun enters NFS market with Netra

By Ben Heskett
Mountain View, Calif.

Sun Microsystems Computer Co. this week will introduce its first Netra server optimized for high-speed Network File System (NFS) access, a market that Dataquest, Inc. says is growing at 25% annually.

The Netra nfs 150, which is aimed at workgroups, will allow users to access files using a Web browser.

The box runs the SmartServe operating system, which is based on Sun's Solaris but is tuned specifically for high-speed NFS access.

The Netra nfs 150 is priced at $25,295 for a base configuration and will ship in July.

In other server news:

■ Integrix, Inc. introduced an Internet server last week based on Sun's UltraSPARC processor and architecture. The server includes an Internet software bundle as well as a fast/wide SCSI interface for storage expansion (see graphic). The IGS1170E runs Solaris 2.5.

The Integrix IGS1170E costs $18,500 and will ship in June.

■ Mobius Computer Corp. announced a line of Alantra servers targeted at corporate intranets. The servers are bundled with Microsoft Corp.'s Internet software package and include support for NetWare clients. An electronic mail gateway and metering software are also included.

The Mobius AS/1000 and AS/1000Pro are available now at prices starting at $4,878 and $7,229, respectively.

✆ Sun: (800) 821-4643; Integrix: (800) 300-8288; Mobius: (800) 662-4871.

NFS INTERNET SERVER RAGE CONTINUES

Company/ product	Features
Sun's Netra nfs 10 server	A 167-MHz UltraSPARC processor, maximum of 12 internal disk slots, HTML-based user interface, RAID5 support.
Integrix IGS1170E server	Internet software package with E-mail, a firewall and NetScape's Communications Server. Four Sbus slots for network connections. A 167-MHz UltraSPARC processor and Ultra Port Architecture.
Mobius AS/1000 line	Windows NT, Microsoft Internet Information Server and Microsoft's Web browser. A 166-MHz Pentium processor or 200-MHz Pentium Pro, 2G to 20G bytes of internal disk, and 1 or 2 Ethernet connections.

Landmark

Continued from page 25

"When you monitor that many metrics, the danger is that you will provide administrators with a lot of numbers and not much information," Clark said.

Landmark addressed that problem by combining most of the metrics that describe the health of a single component into a single report, Spangler said.

For example, rather than having disk drive metrics — such as the number of file operations per second or percentage of disk space utilized — appear separately, they are combined in a single report.

The Domain Station can display and graph historical data, or it can export the data for analysis in an Excel spreadsheet using Microsoft Corp.'s OLE interface.

It can also export data to mainstream database products or custom applications using Microsoft's Open Database Connectivity interface, Spangler said.

The agents allow users to set parameters for certain metrics that, when exceeded, trigger alarms that appear at the Domain Station, or as electronic mail messages or pages sent via Microsoft's Messaging Application Programming Interface.

The agents cost $1,750 each and will be discounted as low as $250 in quantity. The Domain Station, which will run on Windows 95 or Windows NT Version 3.51 or higher, costs $1,500. All of the products will ship in July. ■

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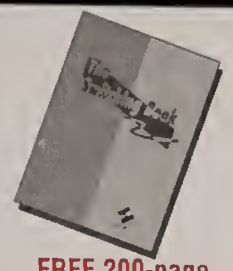

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WIRED WINDOWS

Of Java and network management

Java. Wait! Don't turn the page — this is important to you. I know that it seems you can't read anything without seeing the word Java. But the recent Java announcements, specifically the licensing of the Java virtual machine by operating systems vendors, mean that Java has the potential of being the most important network development since TCP/IP.

Within two years, the Java engine will be part of every major desktop and network operating system. Theoretically, this means a Java applet that runs on one of these operating systems will run on all of them. I'm not talking about the animation/multimedia glitz you've been hearing about.

Dave Kearns

What I am talking about is network management. Network management that lets you receive an alert no matter where you are, no matter which platform you are using. Network management that lets you launch data-gathering applets, management applets and recovery applets, regardless of platform. Management of everything on your network from a central location — but a location of your choosing.

However, there are two additional pieces that must be added to the Java equation that are important to this vision.

The first is messaging. Alerts must use a messaging transport, and the alert must be able to launch a local application or applet. Not all of them will do this, and you would not want all of them to do this, but the ability — hopefully configurable by the network manager — must be there.

The second point, and probably the more important, is standards. Java and Java applets cannot be allowed to go the way of HTML browsers and Web servers. Netscape and Microsoft have made a mockery of the standards process with their unilateral extensions to HTML.

And no matter what their flacks and hacks will tell you, there's only one reason for it — commercial advantage, which leads to customer disadvantage. ANSI standard C source code was also supposed to be portable from one platform to another, but the compiler vendors all thought they had a better idea: They'd each give you extensions, which, while meeting a perceived need, made portability a tortured trail of code rewriting.

Microsoft has apparently already started to jockey for position on the road to Java. The intention seems to be to wrap Java inside ActiveX which, with DCOM, is the successor to OLE and network OLE.

Of course, OLE, DCOM and ActiveX are strictly Windows items. By wrapping Java and using ActiveX to extend its capabilities, Microsoft hopes to capture even more of the desktop and network market. This is not in the best interest of the general user and, specifically, not in your best interest as a network manager.

You need tools that are not platform-dependent. Unless you are vocal about this need, unless you start talking to the vendors now, I fear we're not going to get these tools. Recognize how important Java can be to you. Talk to the operating systems vendors now to preserve the most important feature of Java — its portability.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. Contact him at dkearns@msn.com.

Tip of the week

For a look at Java development tools, visit http://www.sun.com/sunsoft/Developer-products/java/tnb/. An early version of the Java Workshop is available for download (Solaris, Windows 95 or Windows NT only). Be warned, though, that this is a very big download — 21M bytes!

NET RESULTS

What makes good network design?

Network managers who lack either the time or the tools to properly design their networks simply throw more bandwidth at the problem. The argument is that if there is enough bandwidth, problems will not occur.

This rationale is endorsed by vendors that used to hawk Fast Ethernet but now hawk gigabit Ethernet. To aggregate many switched 10M bit/sec ports, bigger bandwidth is needed, and an order of magnitude sounds good. Therefore, Fast Ethernet is what is needed.

When you follow this logic, it becomes clear that once enough 100M bit/sec Ethernet is installed, an even faster pipe will be needed to aggregate those links, and therefore gigabit Ethernet will be called for.

Vendors continue to advocate bandwidth more than good network design. In fact, there seems to be a general sense of apathy about good network design since vendors can offer solutions with a good price-per-megabit ratio.

Gigabit Ethernet is slated to cost two to three times the price of a 100Base-F connection. So for double the price, you get 10 times the bandwidth. This was also true of Fast Ethernet, which has ridden the pricing curve down to far beyond that point.

But is price per megabit the only issue? We don't believe it is — or should be. The question remains: Can bandwidth solve every network problem known to man? And can Ethernet — a LAN whose design center was never the backbone — really scale well enough to fit users' needs?

If traffic levels are low, meaning that the bandwidth was added to create "headroom" for growth, the bandwidth solution will work quite well. Congestion levels will never be reached and the only problems to deal with will be the standard errors and configuration issues.

But we must also look at the NICs, the servers and the traffic flow to see if adding bandwidth can solve everything. The NICs for gigabit Ethernet will solve the collision problem via full-duplex operation. The NICs will have to handle bursts of traffic of up to a gigabit per second.

Skip MacAskill and Melinda Le Baron

One would suspect that these NICs will have to be very powerful to ensure that no frames are lost.

Considering that most enterprise applications are installed on centralized servers, many users access one server on a first-come, first-served basis.

The key here is not the bandwidth, but how the traffic is handled on the transmit and receive end of the NIC, on the server bus and on the processor in the server, as well as the time it takes for processing. Any one of these factors could degrade performance.

If the host NIC can't handle incoming traffic from many simultaneous users, there are retransmissions that further exacerbate the problem. If the NIC steals processor cycles away from the server to handle traffic loads, then there may not be enough cycles to process the data once it is received.

If the server bus gets congested, it will cause delays and backup for the NIC, which will, in turn, start dropping packets and necessitate retransmission. If the processor is busy, this can add latency to the turnaround trip and prevent backup frames from getting across the operating system boundary and so on. The bottom line here is that users should look beyond the big bandwidth pricing metric because there is more to networking than just a big fat pipe.

MacAskill is a senior research analyst and Le Baron is a research director in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached at (203) 316-1111 or at inquiry@gartner.com.

Briefs

■ **RSA Data Security, Inc.** *and a group of electronic mail makers recently gave the first public interoperability demo of* **Secure Multipurpose Internet Mail Extensions (S/MIME),** *a specification that enables messages composed in one vendor's application to be decrypted in another. The specification is expected to be refined over the summer.*

RSA: (415) 595-8782.

■ **Communication Intelligence Corp.** *is shipping Sign-It, software for* **capturing electronic signatures** *in Lotus Development Corp. cc:Mail environments. With Sign-It, users may approve and sign electronic forms by signing their names on electronic pads.*

CIC: (415) 802-7777.

■ **LinkAge Software, Inc.,** *a provider of messaging gateways, and ISOCOR, a messaging backbone vendor, next month will ship* **integrated messaging and directory synchronization software.** *LinkAge's X.400/SNADS gateway will work with ISOCOR's Isoplex X.400 Message Transfer Agent to link IBM host-based mail systems and X.400-based systems. Pricing was not available at press time.*

ISOCOR's Isoplex Directory Service product has also been integrated with LinkAge Directory Exchange. That software synchronizes X.500-based mail systems with IBM, Microsoft Corp. and Lotus Development Corp. directories.

LinkAge: (613) 594-9244; ISOCOR: (310) 581-8100.

■ **Documentum, Inc.** *this month will ship an enhanced version of its Documentum Application Development Toolkit that includes the* **Java API,** *allowing developers to build Web-enabled document management applications that may be launched with or without a browser. The enhanced version of the tool costs $20,000 for a 10-user license.*

Documentum: (510) 463-6800.

Sybase talks up object plans at user conference

By Barb Cole
San Diego

Sybase, Inc. executives gathered here at the company's annual user group meeting to talk up its Adaptive Server Architecture, which Sybase claims will support object applications and retain the high-performance of relational databases.

Though no product announcements were made, the first pieces of the Adaptive Server will be rolled out this summer and will ship by the end of the year, according to Dennis McEvoy, president of Sybase's Enterprise Business Group.

The design goal is to support object data types within SQL Server 11, the company's flagship database, and roll out a series of "snap-ins" to support text data, time series, spatial data and user-defined data types, according to McEvoy. The company already supports objects within its PowerBuilder development tool and middleware.

The announcement comes about a year after Sybase stumbled badly when its newly released SQL Server 10 was found to offer poor performance. The company has since released a well-received upgrade; however, Sybase's object strategy seemed to get sidelined by the whole ordeal. Indeed, the company admits it has aborted some object projects over the past year.

Object support is seen as key to the relational database companies because users wish to build applications that are based on reusable code. In addition, the success of intranets has accelerated the rate at which companies are looking to build applications that incorporate multiple data types such as text, audio and video.

Though McEvoy offered few specifics, he said full integration of the relational database and snap-in pieces was not a main goal. He added that there will likely be separate data stores for certain kinds of information.

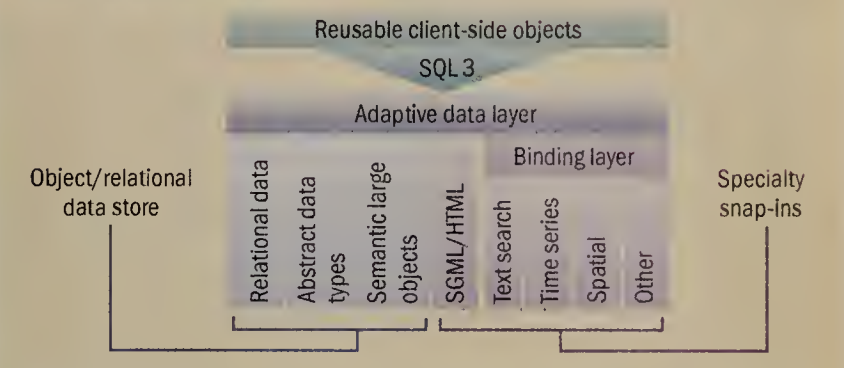
The approach of having multiple data stores is a departure from what Sybase's chief competitors — Oracle Corp. and Informix Software, Inc. — have described as the ideal way to support objects. Both rivals have announced so-called Universal Servers, which are designed to house all the data in a central repository.

"We're not being religious and saying that all this stuff has to be in one server. We think the universal database idea could turn out to be a universal disaster," McEvoy said. "Our approach is a component approach, which is more in-line with object technology," he said.

Analysts and users applauded the plan.

"It's nice to see that [Sybase] is thinking about objects in the context of a strategy," said Neil Herman, a financial analyst at Salomon Brothers, Inc., an investment bank in New York. "There's no question that they have a vision now, but it will be some time before we see products based on this," he said. ■

SYBASE ADAPTIVE SERVER ARCHITECTURE



Sybase's Adaptive Server calls for the integration of certain data types within the core relational engine, plus the addition of specialty snap-ins to support HTML, time series, spatial and user-specified data types.

Powersoft ships PowerBuilder 5.0

Powersoft Corp., a Sybase, Inc. subsidiary, last week released Version 5.0 of its PowerBuilder for Windows application development tool, with new features supporting creation of faster and bigger distributed applications.

Version 5.0 lets developers run part of the application on the client, and the rest, which holds the business logic, on application servers.

The new release also for the first time compiles the underlying Powerscript language, in effect translating it directly into code the computer can understand.

A separate companion product, called Object Cycle, was also announced. It runs on a server and handles an array of object management tasks, such as version control and labeling.

PowerBuilder 5.0 is available now on all Microsoft Windows platforms; Unix and some Windows NT hardware platforms will be ready by year-end.

Prices range from $295 to $2,995. Contact Powersoft at (508) 287-1500.

—John Cox

Get objective online (http://www.nwfusion.com)

- Sybase's object plans
- A look at the cancellation of a key object effort
- An article on PowerBuilder 5.0

Select News+ then Client/Server Applications.

NetworkWorld Fusion

Data conferencing tools debut

By Barb Cole

FutureLabs, Inc., DataBeam Corp. and Intel Corp. have announced tools for building T.120-compliant data conferencing applications.

T.120 is a standard set of protocols and services for data conferencing via standard phone lines, ISDN and LANs. The specification defines how users may use computers to jointly view documents, make annotations and run applications.

FutureLabs last week rolled out the T.120 Tool Kit, a C++-based tool for building T.120 data conferencing applications. Available now, FutureLabs' T.120 Tool Kit runs on Windows NT. Pricing starts at $25,000.

DataBeam last month took the wraps off software for running data conferencing applications over the Internet. The neT.120 Conference Server lets users with Web browsers participate in data conferences with no additional desktop hardware or software.

The neT.120 software runs on Windows NT or Solaris and can host a variety of collaborative applications, including electronic whiteboards. Available in August, the neT.120 Conference Server is priced at $495 for eight users and $8,995 for 100 users.

"This [data conferencing] technology is still relatively new and few companies understand how significant it is," said Al Lill, vice president and research director at Gartner Group, Inc. in Stamford, Conn. The Internet will provide a viable, inexpensive platform on which to run shared applications, he said.

Separately, Intel recently announced a new version of a T.120-compliant video-, audio and data conferencing system that lets as many as 24 people participate in a videoconference from their desktops. The system, which includes an ISDN card, video card, camera, earphones and microphone, runs on Windows. Pricing is $1,299 through June and $1,499 thereafter.

©FutureLabs: (415) 254-9000; DataBeam: (606) 245-6500; Intel: (800) 525-3019.

SHARED LOGIC

Daniel Blum

EMA attendees blown away by 'Net

Last year's Electronic Messaging Association (EMA) conference was swept away in the Great Flood of New Orleans. This year's conference in Anaheim, Calif., was caught in an Internet tornado.

It began the Monday before last with a packed session in which executives from the major vendors acknowledged the Internet's market dominance.

This bodes well for adoption of the Internet Post Office Protocol 3 and the Internet Message Access Protocol 4 (IMAP4), which I wrote about in my last column. As one product manager with a historically proprietary product line wryly commented, "It's the year of the protocols—Protocols 'R' Us."

Also stirring interest at the conference was Netscape Communications Corp.'s previously announced commitment to support the Lightweight Directory Access Protocol (LDAP) in the second half of the year. LDAP is a sweet little protocol that's easy to implement, runs over TCP/IP and can access most X.500 directory products and a good many databases, as well. Together, LDAP and IMAP4 may open up client/server messaging once and for all.

While in Anaheim, I spent time with messaging savants trying to figure out who the market winners and losers will be. Among others, I talked to Eugene Lee, vice president of marketing at Coordinate.com, Banyan Systems, Inc.'s entrepreneurial Internet division.

Lee sees a major discontinuity between today's largely proprietary messaging products and the standards-based products of tomorrow. The functionality of offerings such as Microsoft Corp.'s Exchange, Novell, Inc.'s GroupWise and Lotus Development Corp.'s Notes has been ramped up over the years and the products lead the market today. At the same time, the companies are opening up their product lines by rushing to support the Internet in as many ways as possible.

But as the products are opened up, Lee argues that functionality will suffer because proprietary features will be rendered inoperable in a mixed vendor environment.

Meanwhile, newer products leveraging the latest tools and open interfaces are being developed at a rapid rate and may be getting ready to blow past the current leaders, he said.

Schooled to believe that the rich get richer and the big get bigger, I wondered about Lee's theory. Lotus has 12,000 business partners; Microsoft, Netscape and Novell have many independent software vendors supporting their offerings, as well. So it seems as if they can develop new products at a pretty rapid rate, too.

Still, some of the independent software vendors (ISV) following them are not always happy with their leaders. For example, just ask executives (off the record) at companies such as Reach Software Corp. and ON Technology, Inc. what they think of the Messaging Application Programming Interface. The de facto standard that Microsoft controls is basically decimating their business. Given the choice, some say, ISVs would rather bet on standards that are not only open, but also in the public domain.

The Internet has brought a welcome relief from unrelenting consolidation of the messaging market. But the winds in the vortex are blowing in different directions. We'll see some new faces at future EMA conferences and also lots of the old ones. Many of them will be users, coming out ahead in an environment where everyone's rate of new product development is speeding up.

Blum is a principal at Rapport Communication, a consultancy that focuses on messaging, groupware and electronic commerce. He can be reached at dblum@interramp.com.

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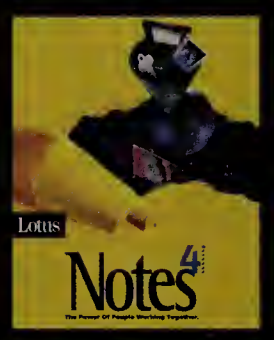

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WEB DATABASE CONNECTIVITY

Users stretching the Web to access critical corporate data

By John Cox

Almost as fast as you can say "World-Wide Web," corporate application developers are stretching the limits of the technology by attempting to give end users access to existing corporate databases through their Web browsers.

In the process, developers are discovering a wealth of opportunities and a minefield of potential problems. Approaches to linking the Web — specifically, the Web server — with networked databases vary. With each approach and every tool, there are trade-offs for the wise customer to consider.

One approach to merging databases with the Web browser and server worlds is to write straightforward server-based programs that use the Common Gateway Interface (CGI), a Web standard for accessing external programs. A second approach is a variant of the first: creating a CGI link to the Open Database Connectivity (ODBC) interface.

Yet another option is using a more efficient and flexible, but proprietary, Web server API, such as Microsoft Corp.'s Information Server API (ISAPI) or Netscape Communications Corp.'s Netscape API (NSAPI) with ODBC to accces the remote database.

Finally, developers can, in effect, sidestep the Web server entirely and use a third-party middleware product that itself may implement some of these interfaces.

These approaches typically use the Web browser simply as a receptacle for a Web page, formatted in HTML, which is downloaded from a Web server. The user can request database information by filling in blanks on the form, which is, in effect, resubmitted to the Web server. At the server, the connections are made via the various interfaces to the external database, which processes the query or update. The results are returned to the Web server, where they are formatted into a new HTML page and returned to the client browser.

Using CGI and various scripting languages to do this is straightforward, users say.

"We've been doing quite a bit with PERL [a scripting language] and CGI scripting on the Web server to get database access," said Bruce Sielaff, program lead with Health Systems Integration, Inc., a Bloomington, Minn., Compucare Co. subsidiary that designs software for Heath Maintenance Organizations and similar companies. "It gives you a lot of flexibility in what databases you can hit. For a lot of users, it would be more than enough," he said.

But there are trade-offs. For one thing, the CGI interface is stateless — in practical terms, CGI programs cannot support sustained interaction between the user and the database. So it is not possible to support transactions over the Web. "For that, you need connections to be maintained back to the client," Sielaff said. "Using straight HTML, you can't do that."

Another concern is the relative inefficiency of CGI and the need for multiple CGI programs, said Kim Ball, vice president of technology for XDB Systems, Inc. in Columbia, Md. XDB is creating a range of tools for linking Java applications to networked databases. According to Ball, each time a database user connects to the Web server, and for every user that connects, the server creates a new instance or copy of the CGI program and runs it. For complex applications, or lots of users hitting the Web server, that adds up to a lot of work.

One solution, Ball said, is to use a tool that creates an interface between the CGI and ODBC. This eliminates a lot of CGI coding.

Developers are using Microsoft Corp.'s Database Connector (DBC) in precisely this way. "If you had 10,000 product specification pages, you'd need 10,000 [HTML] files [on the Web server]," said one developer, who asked not to be identified and who is working with early release code of several announced but unreleased Microsoft Internet products. "With DBC, you need one 'template' page, which can dynamically generate 10,000 spec sheets [from a back-end ODBC database] when the users need them."

The application type influences the access approach. "We reviewed doing CGI programming, but we wanted to build interactive applications that would send the data back to the users and let them manipulate it locally," said John Peak, partner with Five Points Consulting, a business application developer in Atlanta. CGI simply will not support that kind of true client/server interaction.

One solution to the statelessness of CGI, according to XDB's Ball, is to use a connection agent with ODBC — software that sits between the Web server and the database and that maintains the connections between them. The trade-off here, she noted, is that the applications are limited to the HTML extensions for tasks such as retrieve and update. Complex interactions are not possible.

It is not surprising that developers are trying to bypass part or all of the Web server. One route is to use Web server APIs, such as those from Microsoft and Netscape, instead of CGI. These APIs are optimized for performance, are published to encourage widespread use, and create a point of integration for applications, data and third-party products. They are also the linchpin in the respective architectural frameworks of Web server vendors — a fact that's both a benefit and a drawback.

The benefit is developers can exploit the API's features to use other Web server capabilities, or third-party products, as part of the database application. One example of these other capabilities is authentication services. The result is everything CGI is not: a scalable and efficient link to networked data.

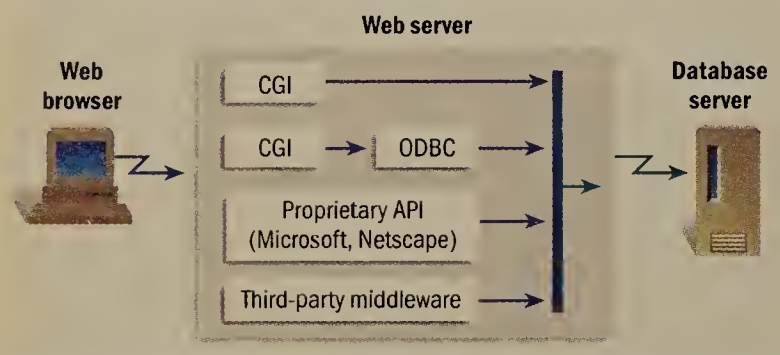
The potential drawback is that the developers are committing themselves to a given vendor's API solution. That "lock-in" may or may not be a problem.

Still another approach is to set up what can almost be considered a complementary or even parallel software infrastructure, optimized to connect browsers — and applications running inside them — with corporate databases. In this approach, the downloaded applet uses a different mechanism to connect directly to the target database or to a layer of middleware software. This middleware layer supports a range of distributed application services, such as directory and services, and transactions.

Users should look closely at how particular vendors implement database access to understand how this will affect the applications they want to build. ■

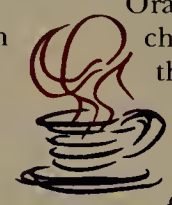
DATA ACCESS OPTIONS FOR THE WEB

Application builders can work with the Common Gateway Interface (CGI) and a range of scripting languages to forge links to existing databases. There are also a growing number of development tools and middleware connections that offer graphical development environments, fast performance and scalability.



Software bridge links Java and ODBC data

Sun Microsystems, Inc's JavaSoft unit this week is expected to announce a tool to link Java applications to databases that support Microsoft Corp.'s Open Database Connectivity (ODBC) interface.



The software is actually a bridge between JavaSoft's Java Database Connectivity (JDBC) interface and ODBC, which is widely used for accessing corporate data.

The recently announced JDBC API specification, which is intended to create a uniform way for Java applications to access different vendors' SQL databases, is still being finalized. But the bridge means Java developers need only work with JDBC to build database applications that can also access existing ODBC data.

"How to get at my corporate data has been a big issue for Java developers," said Ed Peters, vice president and general manager for Intersolv, Inc.'s DataDirect division, which created the bridge software for JavaSoft. "This [JDBC/ODBC bridge] lets developers deploy Web applications that have the same database access capabilities as [traditional] client/server applications."

The bridge is fully compatible with existing ODBC drivers. In the future, as JDBC drivers are built for specific databases, such as those from Oracle Corp. and Sybase, Inc., developers can choose a pure JDBC link to databases or use the bridge to ODBC. JDBC will support interchangeable database drivers by means of a driver manager. The driver manager will automatically load the proper JDBC driver for connecting to a specific database.

Peters said the bridge is not limited to two-tier, client-to-database applications. "You'd have the ability to make the call to the server environment, which could then access heterogeneous databases that could reside on different servers," he said. "Then you bring the data back to the server and return it to the [client] application."

The bridge is now being beta-tested. According to Intersolv, JavaSoft will integrate the bridge with Java, and it will be available in June.

—John Cox

Intranets & the 'Net

Covering: Internet Technologies and Services for Collaboration and Electronic Commerce

Briefs

■ **Stream International, Inc., LitleNet Network, Inc., BBN Corp., and KPMG Peat Marwick** *are spearheading what they call the Electronic Licensing and Security Initiative to develop industry standards for mass-market* **electronic distribution of software**. *The group expects to have a test of its so-called clearinghouse model by year-end.*

■ **Arachnid Software, Inc.** *of Menlo Park, Calif., this week will launch a server software product called WebPower, designed to help companies create and manage* **personalized, interactive intranets** *and Web sites. Key benefits include collaborative authoring, version control and user-access control.*
A single-user version of WebPower sells for $595. Quantity discounts are available.
Arachnid: (415) 854-7730.

■ *Sens. Conrad Burns (R-Mont.),* **Bob Dole** *(R-Kan.), and Patrick Leahy (D-Vt.), among others, have introduced a bill entitled the Promotion of Commerce On-Line in the Digital Era Act of 1996, which would* **remove export restrictions** *on strong encryption products.*


Dole

■ **Security APL, Inc.'s** *Portfolio Accounting Worldwide division has developed an Internet-based* **mutual fund trading site** *on the World-Wide Web. Path On-Line, for San Diego-based firm Jack White & Co., lets customers place orders for stocks and mutual funds online.*

■ **Interactive Corporate Communications, Inc.** *is shipping a Web application called Click HR that lets corporations set up* **human resources** *management on their intranets so employees can access information in text, graphics and multimedia using a Web browser. The software starts at $10,000.*
Interactive Corporate Communications: (718) 961-4333.

Digital preps AltaVista line for intranet glory

By Carol Sliwa
Cambridge, Mass.
Digital Equipment Corp.'s hottest iron in the fiery Internet arena has been its popular AltaVista search engine. So last week, the Maynard, Mass.-based company extended the tool for corporate and personal users, and then bestowed the AltaVista name upon its entire Internet software product line.

At a press conference broadcast live via the Internet, Digital introduced three new members of the AltaVista search family: an Enterprise Edition intended for corporate intranets that will run on 64-bit Digital Unix; a Workgroup Edition for corporate departments or smaller companies that will run on Windows NT; and a Personal Edition for PCs running 32-bit Windows operating systems.

The Personal Edition will let users scan their PC's hard drive and shared network files.

With the Workgroup and Enterprise Editions, companies can set up parameters for searching publicly posted Web pages. These tools also have the ability to let loose a spider to index anything behind the corporate firewall.


Digital's *Lang*

Beta-testing for all three search engines is slated to begin in June. Ilene Lang, Digital's Internet Software Business Unit vice president, declined to disclose pricing and general availability dates. She did say the Enterprise and Personal editions would come out about the same time, with the Workgroup Edition to follow.

Xerox Corp.'s Joseph C. Wilson Center for Research and Technology in upstate New York is eager to beta-test all three editions. Xerox scientists have been using the public AltaVista search service that Digital launched in December.

"It'll be good to have that capability for working inside Xerox and for searching personal file systems," said Gregory Zack, manager of the Design Research Institute, which is part of the Wilson Center.

Xerox also wants to gain the ability to search discussion threads and shared documents created through Digital's Web Forum software (now known as AltaVista Forum and one of several products Digital has renamed to take advantage of its hot Internet commodity). With a mixed Windows and Unix environment, Xerox is "especially attracted to a Web-based solution," according to Zack.

Due out this summer is a new version of Forum featuring real-time conferencing.

This week, Digital will unveil AltaVista Mail Version 1.0, a Simple Mail Transfer Protocol-based mail server targeted at small and midsize businesses. The Windows NT-based server works with Post Office Protocol 3 clients and includes an API for building mail-enabled applications.

Available next month, AltaVista Mail costs $495 per server and runs on Intel Corp. and Digital Alpha platforms.

Also scheduled are upgraded versions of the rest of the newly renamed Internet software line: AltaVista LAN Browser, formerly Workgroup Web; AltaVista Firewall and Tunnel, both available now on Unix, with Windows NT versions nearing release; and AltaVista Manager, scheduled for a fall release.

Senior Editor Barb Cole contributed to this story.

Open Market ships faster Web server

By Ellen Messmer
Cambridge, Mass.
Open Market, Inc. last week began shipping Secure WebServer 2.0, a tool based on FastCGI, a Web-to-database specification for speedier throughput than its predecessor, the Common Gateway Interface.

CGI has been widely criticized for being slow. This is because it opens and closes database connections every time a user queries the server. The CGI specification first appeared as freeware from the National Center for Supercomputing Applications (NCSA).

In contrast, FastCGI lets the Web manager determine exactly how long the connection to the database should be maintained or shutdown. "This makes FastCGI appropriate for use in corporate intranets where the Web is seen as the front end to mainframes or integrated into client/server," said Bill Hobbib, Open Market's marketing manager.

FastCGI, authored by Open Market and the NCSA, has been put in the public domain as the proposed successor to CGI, Hobbib added. If the industry rallies around it, third-party software developers could be spared the costs associated with building to today's broad array of CGI alternative interface specifications.

For application developers, Open Market has readied FastCGI application libraries for interpreting PERL, TCKL and Java scripts.

Secure WebServer 2.0 also supports Adobe Systems, Inc.'s Acrobat page-at-a-time extensions, so users do not have to download an entire Portable Document Format file to look for a single page.

Open Market still supports Netscape Communications Corp.'s Secure Sockets Layer (SSL) specification for communications security between the browser and the server. However, this time around, Microsoft Corp.'s competing Private Communications Technology (PCT) specification is also part of Open Market's Web server.

The server will automatically determine whether a browser is using SSL or PCT, and set up a secured session accordingly, Hobbib said. Microsoft will have PCT in the Internet Explorer 3.0 browser, due out next month.

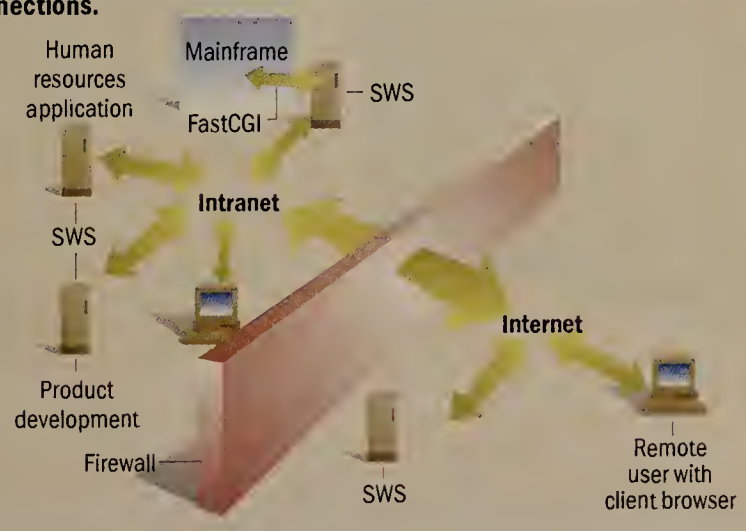
Secure WebServer 2.0 will include the capability to generate and store activity logs. The server also ships with WebReporting 2.0, a tool that can determine which users visited a Web site and what they did during a particular period.

Secure WebServer 2.0, available for Unix, comes bundled with WebReporter for $895. The WebReporter will sell separately for $495.

✆Open Market: (617) 621-9500.

Open Market's Secure WebServer 2.0

Secure WebServer (SWS) speeds Web-to-database throughput by using FastCGI, which lets Web managers determine the exact length of connections.



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Technology Update

Keeping Up with Network Technologies and Standards

NETWORK HELP DESK

Network World tracks down answers to your questions. Please submit them to Chris Nerney via phone at (800) 622-1108, Ext. 451, the Internet at cnerney@nww.com or fax at (508) 820-1103.

We have a client who recently installed NetWare 4.1 on a Pentium server with 16M bytes of RAM. The server has started to crash at approximately the same time each night when no users are logged in and no processes are running. At first, the server simply gave a "system terminated" message with an option to save a core image. Now the client is getting an abend message.

We've tested the server hardware, and it looks fine. We also attached an uninterruptible power supply (UPS) to the server to check for power surges or drops in power and didn't notice any.

We're stumped. Do you have any suggestions?

InSync Communications, Inc.

Ron Nutter, a Master Certified Novell Engineer in the Lexington, Ky., area, suggests a number of things to try. Some are:

- Verify that you have the latest DS.NLM and NetWare 4.1 patch kit installed. Then check the modules listed in Novell's PATLST.TXT file to make sure the appropriate updates are installed on the server.
- Look at the percentage figure in the monitor for the cache buffers. If this figure is below 30%, more memory might be needed.
- Make sure you are using an intelligent UPS that has overvoltage and spike protection.
- Look at the CMOS configuration on the server and try turning off any additional caching of ROM bios.
- Check out a product from Alexander LAN, Inc. in Nashua, N.H., that tracks this type of situation and allows the server to automatically restart.
- When the server abends, key in 386DEBUG to get into NetWare's 386 debugger. Type .P to get a list of processes. This will help identify if one of the NetWare Loadable Modules is causing the problem.
- Lastly, type in U EIP-2 and press Enter. Check the right side of the server screen to see if the word "software" appears. If it does, this means the problem relates to software.

ATM access products ready legacy traffic for the wide area

By David Yates

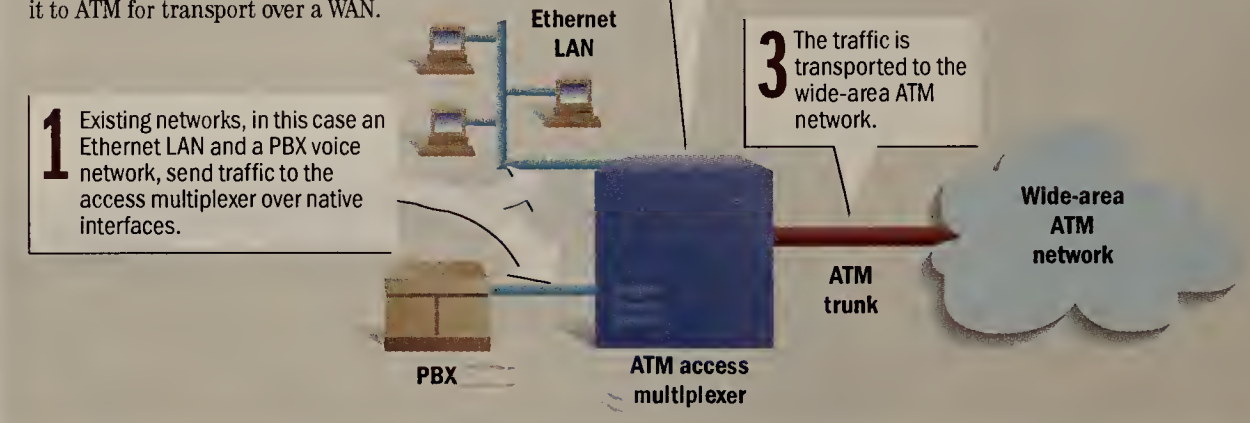
A new generation of Asynchronous Transfer Mode equipment, called intelligent ATM access products, is helping to make the cost-effective access and deployment of value-added ATM-based services a reality.

Intelligent ATM access products — sometimes called ATM multiplexers, concentrators or aggregrators — let network managers tap ATM services from LAN backbones without disrupting users' daily operations or requiring costly upgrades to existing equipment and applications. These products integrate legacy traffic from multiple data, video and voice networks, and convert it to ATM for cost-effective, standards-based transport over the wide area.

HOW IT WORKS

Accessing an ATM net

Intelligent ATM access devices integrate legacy voice, data and video traffic and convert it to ATM for transport over a WAN.



Dynamic duo

ATM multiplexers complement campus and wide-area ATM switches. They combine voice and video with data traffic from the local switch to transport it over a high-speed ATM backbone. Likewise, working with ATM WAN switches, they provide the means to get legacy traffic onto the wide-area ATM network.

Early ATM switches offered some access capabilities, but such multipurpose incarnations have been superseded by products focused purely on ATM switching. Today's ATM switches have faster processing capabilities and more ports and cards than their general-purpose predecessors; they focus on switching and leave the access to the stand-alone devices.

Gain without the pain

ATM multiplexers must interface to data, voice and video networks without necessitating expensive upgrades to existing equipment — and without compromising the services those networks provide to end users. They have to offer native interfaces to a variety of existing networks, including local ATM, Ethernet, frame relay, private branch exchange and T-1 multiplexer. They also must have features sophisticated enough to handle each efficiently.

For example, the T-1 interfaces on ATM access products that attach to PBXs should act just like the existing T-1 interfaces offered by public networks. According to the ATM Forum, this should be done using the structured ATM Circuit Emulation Service (CES) capability.

Structured CES specifies how to carry voice over ATM so that each voice channel or group of channels within a T-1 can go to a separate destination. Unstructured CES, a less user-friendly method of carrying voice over ATM, requires that the entire T-1 circuit by sent to one remote destination.

Structured-mode capabilities reduce the cost of moving to ATM because existing interfaces on the PBX continue to work normally.

With the unstructured method, it is often necessary to add trunk interface cards to the PBX and to waste wide-area bandwidth because this mode does not allow routing of sub-T-1 rates.

Policing the network

Because ATM access products combine different types of applications, they must provide excellent traffic and bandwidth management.

They must consistently handle real-time traffic, such as voice and video, with very low latency and jitter and simultaneously maximize the throughput of bursty data traffic. This tricky balancing act is made more difficult when, as often happens, the bandwidth available on the local side of the access product exceeds the available wide-area bandwidth.

For instance, a campus network might easily contain ATM or FDDI endpoints that periodically send bursts of traffic ranging from 100M to 155M bit/sec. If such a burst should exceed the contracted rate of a particular virtual circuit, the carrier will drop the excess traffic.

ATM multiplexers can prevent such cell loss by metering traffic onto each wide-area virtual circuit so that it never exceeds the bandwidth purchased from the service provider. This is called traffic shaping.

To make traffic shaping effective, the ATM devices must have buffers big enough to hold large bursts of data from the campus network so that the traffic can be metered onto the wide area slowly.

When they receive a traffic burst so large it threatens to overwhelm the buffering capacity, access products should be able to discard cells intelligently so as to minimize retransmissions.

A comprehensive set of wide-area interfaces is also required for flexible and efficient ATM access.

Large sites need T-3 or Synchronous Optical Network (SONET) OC-3 speed access. Remote sites can be served by a combination of T-1 and NxT-1 ATM services. Access products should handle them all.

Combining traffic of different sorts for transmission across an ATM network is no simple matter. Ultimately, it is essential that ATM access solutions support sophisticated traffic shaping, buffering and prioritization schemes, and a comprehensive set of native interfaces while delivering the required qualities of service to each.

Yates is vice president of marketing at OnStream Networks, Inc., a worldwide supplier of ATM/broadband WAN and access equipment. He can be reached at (408) 727-4545 or dyates@onstream.com.

Need information?

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EDITORIAL INSIGHTS

A documented opportunity

When we write about the big battles for your network dollars, we usually talk about combatants like Novell and Microsoft. But in the months ahead, some quieter companies will be duking it out in a little-publicized part of your network.

Companies like HP and Xerox want to control the way you handle documents, and they've unveiled strategies and products that could save you money and make your life a lot easier.

This fight may not be as glamorous as, say, Microsoft's and Netscape's pitched battle to control the Internet. But, for end users, anything that simplifies production and distribution of all those spreadsheets and reports is a godsend. (It's a digital age but, says Gartner Group, we still print 600 million documents daily.)

HP fired its big salvo last week with its Digital Workplace strategy, which aims to help companies move away from the current method of document handling — where a user prints one copy of a document on a desktop printer, then reproduces it many times for recipients — to a distribute-and-print model. In that model, a user sends a digital copy of a document to the output device most convenient for the recipient.

HP's plan would diminish the role of the copy machine by allowing workgroup members to send documents to networked laser printers that can produce multiple original copies for distribution. (This is known as mopying — for multiple original printing — just so you feel you haven't missed learning a new buzzword this week.) The printers are fast, reliable and handle collating, stapling and chargeback accounting. They're even SNMP-manageable.

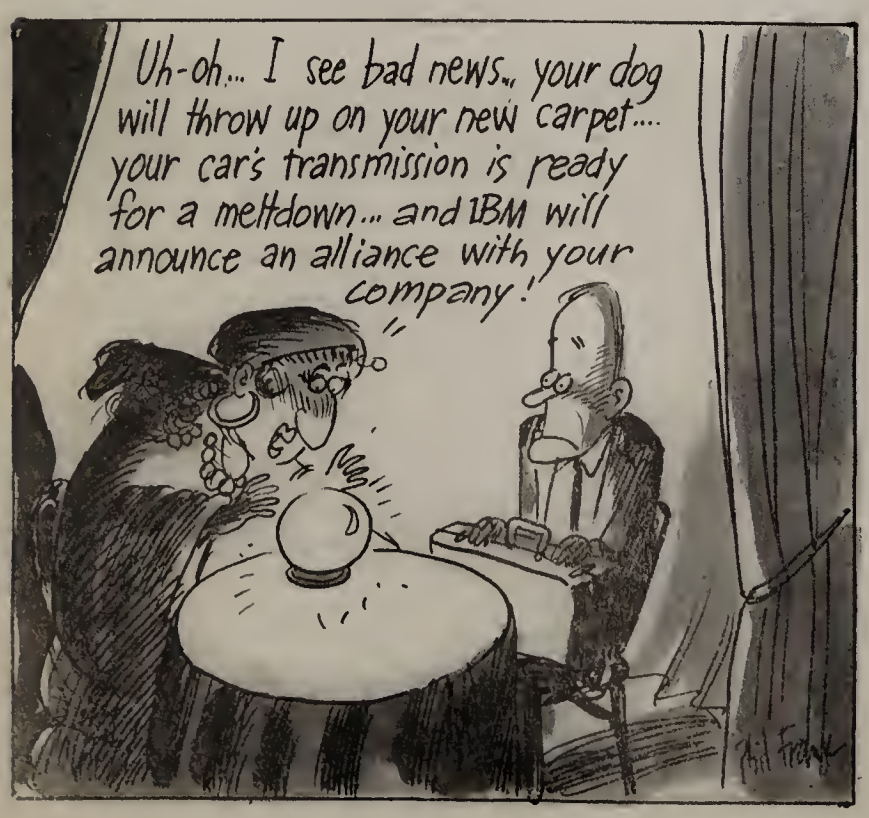
Xerox, a leading copier manufacturer, clearly anticipated this threat, announcing back in October a line of Document Centre devices for NetWare networks that combine laser printing, copying and faxing, along with administrative tools. Both companies are lining up partners for wider network support and to make sure fonts and layouts remain consistent on disparate devices.

Making it easier to distribute and print documents is one of those rare opportunities to look good. It's more visible to your clients than, say, configuring a directory. So take some time to learn what these companies are doing. You can learn more from HP at www.hp.com and Xerox at www.xerox.com/news.html.

John Gallant, editor in chief jgallant@nww.com

Teletoons

By Phil Frank and Joe Troise
guru@well.com



SPEAKING THE LANGUAGE

Dispelling myths about viruses is a first step to keeping your net healthy

Linda Musthaler

The winter cold and flu season might be over, but virus season — computer viruses, that is — lingers all year. And much like their medical counterpart, computer viruses take different forms that are immune to established forms of prevention and treatment.

The National Computer Security Association (NCSA), based in Harrisburg, Pa., acts as the Centers for Disease Control for computer viruses. NCSA President Peter Tippett says there are many myths and misconceptions concerning viruses. To effectively combat viruses, you should be aware of the real threats and plan your antivirus program accordingly.

The first myth is that the virus problem waxes and wanes every few years. The truth is that viruses are continuously making the rounds. We only hear about (and tend to focus on) highly publicized virus scares such as those caused by the Michelangelo or Friday the 13th viruses. In reality, those viruses cause relatively minor damage because we are aware of and prepare for them. It's the viruses we don't anticipate or know about that cause havoc.

Highly publicized viruses cause relatively minor damage because we are aware of and prepare for them. It's the viruses we don't anticipate or know about that cause havoc.

Myth No. 2 is that the high cost of viruses is due to lost data and applications. On the contrary, the high cost of viruses most frequently stems from lost productivity as network managers and PC users stop all other work to search for viruses in their computers. Once uncovered, the viruses must be removed and the infected computers, disks and programs disinfected. As you can imagine, or know firsthand, this takes time.

Myth No. 3 is that bulletin board systems (BBS) are a major source of computer viruses. In reality, surveys conducted by the NCSA show that most companies stand only a 2% chance of getting a virus from a downloaded file. The most common type of virus — the boot-track type — simply does not move through BBSs; it travels via diskette. Nevertheless, this myth leads many companies to institute virtually worthless policies concerning the downloading of files from BBSs, online services or the Internet.

At the desktop, you should install antivirus software that will automatically scan the PC. (*Network World* reviewed 11 of the top antivirus products last fall. See page 55 in the Oct. 9 issue.) Since users won't tolerate anything that slows them down, your virus-checking routine should be easy, unobtrusive and quick. What's more, don't give users the option of running the scanning program — make it mandatory.

You don't have to safeguard 100% of your networked PCs. If you protect at least half of them, you will greatly reduce the chance of a widespread virus outbreak. As the NCSA's Tippett notes, the world has been able to keep polio in check, even though less than 100% of the world's population has been inoculated. The same principle applies to your PCs.

According to Tippett, viruses rarely corrupt the network server, simply because the executable files on a server tend to be well protected. Unfortunately, there is a disconcerting exception to this rule.

A not-so-new type of virus that is wreaking havoc all over the world is the macro virus. Macro viruses travel in and affect data files rather than the boot sector of computers. You probably have heard of — or even experienced — the most frequent macro viruses making the rounds today: Concept (also known as Winword Concept), Nuclear, Hot, Rainbow and Demonstration Macro Virus (DMV).

The Concept virus holds the dubious distinction of being the fastest spreading virus of all time. First discovered last July, Concept needed less than a month to spread around the world. What's more, at least six variations of the Concept virus are now in circulation.

There's hardly a Microsoft Word user — myself included — that hasn't been hit by the Concept virus. A common symptom is that you can't save your data file as anything other than a document template. Concept may not cause you to totally lose your document, but it sure can be a time waster trying to figure out how to save your file.

The NCSA believes the Concept virus is now the most common and prevalent virus. Microsoft Corp. itself has been battling the virus within its internal user community.

The most troubling thing about Concept and other macro viruses is that, because they spread through data files, they move at network-connected rates.

They travel through servers in the form of electronic mail attachments, shared directories and files copied from diskettes. They also make boot-up scanning virtually ineffective.

Proactive network managers must now safeguard their servers as well as the network's desktop PCs. Antivirus technology must run full-time in the background to try to trap these macro demons. Despite antivirus software vendors' claims that their products won't affect network performance, virus detection at the server will degrade network performance by anywhere from 2% to 10%, Tippett says. Still, it's worth the price if you can prevent a major outbreak.

Last month, the NCSA released a major new survey and study on viruses. The survey is free; the detailed study, with special emphasis on micro viruses, costs $495. To obtain either, contact the NCSA at (717) 258-1816 or via the Internet at office@ncsa.com. You can also visit the organization's Web site at http://www.ncsa.com.

Musthaler is vice president of research at Currid & Co., a Houston-based information technology consulting firm. She can be reached via the Internet at linda@currid.com or by phone at (713) 789-5995.

TELECOM IN TRANSITION

Why long-distance tariffs are going away

David Rohde

By this time next year, the way you negotiate deals for long-distance network services will have changed.

I'm not talking about the regional Bell operating companies entering the long-distance business. Rather, I'm talking about the near certainty that the existing long-distance carriers will no longer be filing formal tariffs with the Federal Communication Commission.

As a result, you'll be able to negotiate the price of any service you wish without making awkward reference to a base price in some obscure government filing. It'll also be easier to make those prices stick because the carriers will lose the protection of the odious Filed Rate Doctrine — the legal precept under which government filings of regulated carriers take precedence over privately negotiated contracts. Most important, you and your selected carrier will be able to negotiate a package price for a turnkey wide-area network complete with routers, switches, multiplexers or protocol converters, bundled together with monthly transport charges.

Pricing of net services is bound to remain confusing and infuriating under the new wide-open system.

The lawyers will argue that, so far, the FCC has issued only a Notice of Proposed Rulemaking (NPRM) to eliminate long-distance tariffs. Ordinarily, an NPRM is the start of a grueling regulatory process fraught with delays and uncertainty. But the fact is, the FCC is determined to get this done because the agency is still under tremendous budget pressure. In the recent budget resolution negotiated between President Clinton and Republicans in Congress, the FCC fell $40 million short of its budget request. And earlier this year, former FCC Chairman Dennis Patrick told a Senate oversight hearing that the single most important thing the FCC could do to streamline itself would be to get rid of the four million pieces of paper filed by long-distance carriers each year.

As one prominent communications lawyer told me, FCC Chairman Reed Hundt is determined to do everything he can to show he's streamlined his agency before going back to Congress to ask for more money. And if there was any doubt where the FCC is headed in this matter, it was eliminated last month when the agency changed the name of its decades-old Tariff Division to the Competitive Pricing Division.

But the surest reason of all why tariffs are going away is that they don't accomplish their purpose. Under both the 1934 and 1996 telecommunications acts, carriers are barred from discriminating against particular customers. Some folks are concerned that if carriers don't file their rates with the government, gross pricing disparities will occur that could hurt consumers, small businesses or simply anyone lacking good market information.

But that's already the case today. Look at AT&T's price schedules. The range of rates that AT&T charges its customers has been growing wider and wider every year, and is now truly astonishing.

Last year, AT&T dropped the rates it charges federal agencies under the government's Federal Telecommunications System 2000 mega-contract to as low as 3 1/2 cents a minute. Yet, nine days after President Clinton signed the Telecommunications Act of 1996, AT&T raised its basic daytime residential long-distance rate to 28 cents a minute, without any fear of retribution.

That's a disparity of eight times for essentially the same thing. How can this be happening right under the FCC's nose? For one thing, there's no pressure from any organized interest to do anything about it. The FCC does receive hundreds of protests against tariff filings every year. But the majority are complaints by carriers regarding the fees they pay, such as those switched access charges that long-distance carriers pay to RBOCs.

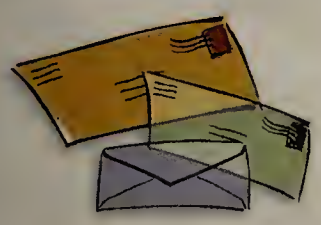
And the FCC's dirty little secret is that for the past few years, the only tariffs they read were those of AT&T and the RBOCs.

To be sure, pricing of network services is bound to remain confusing and infuriating under the new wide-open system. Limited-time discounts and promotions, tricky guarantees poked through with loopholes, misleading come-ons and aggravating termination clauses — they'll all be part of the contract landscape.

But it'll also be true that if you have a lot of business to offer and make it clear that you're taking competitive bids, the carriers will fall all over themselves to give you, in the end, a great deal. And they won't have an outdated regulatory scheme to provide an extra layer of legal uncertainty once the ink on your contract is dry.

Senior Washington Correspondent Rohde covers carrier services, telephone equipment and regulatory matters. Before coming to Network World, *he worked for a telecommunications rate and tariff analysis organization. He can be reached via the Internet at drohde@nww.com.*

MESSAGE QUEUE



The domain game

Regarding Mark Gibbs' column on domain names and the Internet Network Information Center (InterNIC) (April 15, page 58): I think InterNIC's work-it-out-for-yourself policy is the right attitude. Once InterNIC starts trying to determine who has a right to a particular domain name, it opens itself up to all kinds of lawsuits.

Winston Lawrence
Partner
Digital Beat Associates
Garden City, N.Y.

The awarding of domain names should be done on a first-come, first-served basis. It's not fair that a business that realized early on the Internet's potential can lose its domain name to some big company that jumps on the Internet bandwagon later on but has the name trademarked.

Coke's trade name is Coke or Coca-Cola — it's not coke.com.

Linda Kreitz
Internet consultant
4Him Computing
Easton, Pa.

Gibbs' take on InterNIC is absolutely correct. I run a company called Fuji Publishing Group. I was quite pleased in late 1994 when I discovered that the domain name fuji.com had not been taken. Then, late last year, I got a note from InterNIC saying that a certain film company had filed a complaint. This company has registered many domains, even though *all* of its live domains point to the same place.

I sent an E-mail to the company's Webmaster explaining my situation. He said his company would not pursue any further actions against us.

However, the legal department in the company's U.S. division didn't agree and pursued further.

Now realize, they didn't even want the domain — they just didn't want anyone else to use it.

Any dispute that can't be resolved throws the domain into hold status within 90 days. As of November 1995, InterNIC's policy says that even if you've got a valid trademark, if someone disputes the domain name, you've still got to post an insurance bond *and* sign a document holding InterNIC harmless in case a company with deep pockets decides to sue them (NSI Domain Name Dispute Policy Revision 01, Nov. 23, 1995, Page 4, Paragraph 5).

So even though we had been using the domain for 18 months and had been getting nearly a million unique hits a months, the unnamed monolithic company got what it wanted, and my small Internet publishing company got screwed.

Bobby Holstein
President and CIO
Fuji Publishing Group
Tacoma, Wash.

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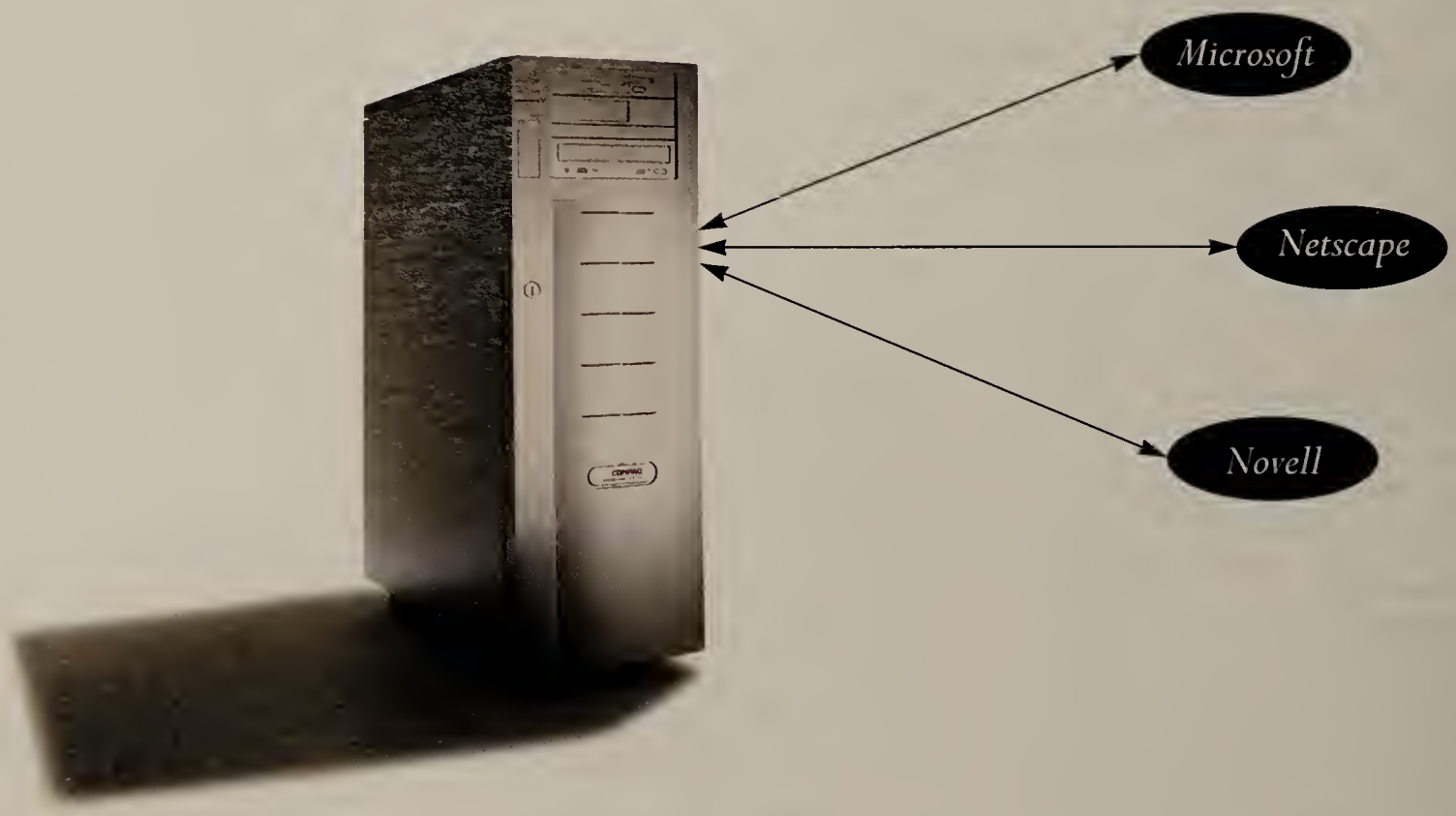

Last year the buzz about the Internet became a reality. Already the changes felt by business have been profound—from the way you can communicate with customers to the new markets it's creating. And now, thanks to Compaq, it's even easier to take advantage of it.

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Feature

Ready, SET, Go

American Express, MasterCard and Visa throw their combined weight behind the SET payment protocol for the Web; merchants may face a learning curve.

By Charles Bruno

You might think David Bauman, Richard Lonergan and Steve Mott wouldn't exactly see eye to eye about electronic commerce.

After all, the three networking executives — who guide electronic commerce strategies for American Express Co., Visa International, Inc. and MasterCard International, Inc., respectively — are working feverishly to distinguish their electronic commerce services on the Internet.

"The first guy in with a credible system tends to have differential advantages in the marketplace," says Mott, senior vice president of global point of interaction ventures for MasterCard.

At the same time, the executives are collectively holding their breath over the imminent arrival of a new wave of software that promises to be a boon for electronic payment transactions across the Internet.

The software, which is being developed by Web server suppliers, Internet browser companies and others, will support the Secure Electronic Transaction (SET) protocol. SET secures payment card transactions over the Internet by using a blend of data encryption, user authentication services and digital certificates. It not only protects a buyer's card number, but also guarantees that the transaction data itself is shielded from tinkering.

Given the momentum behind it, SET will have major implications for merchants on the World-Wide Web. The nascent technology is said to be fairly complex, and likely will force early users to rely on integrators and vendors to get it up and running smoothly.

Moreover, it will require merchants to integrate SET transactions with other forms of online payments — such as electronic data interchange, electronic checks and even digital cash — giving buyers a choice of payment schemes from a single interface (see story, page 46).

Setting the stage

MasterCard and Visa codeveloped SET along with a gaggle of vendors, including IBM, Microsoft Corp., Netscape Communications Corp. and RSA Data Security, Inc.

Visa and MasterCard unveiled SET in early February, and just a few weeks later, American Express pledged support for the protocol. Although the technology is still in a request-for-comment stage, vendors are already working to incorporate support for SET into their products. The industry consensus suggests SET products will hit the street late this year, kick-starting the market for electronic payment transactions on the Web.

"The intent here is to make cyber-purchasing risk-free for the consumer, but also to reduce fraud for the merchant and bring the costs down for them," says Vic Wheatman, vice president of electronic commerce strategies for Gartner Group, Inc. in San Jose, Calif.

SET will give merchants another alternative to telephone mail order and in-store credit authorizations; it will not replace the existing credit authorization networks used by card payment companies.

"What we have with the Internet is another network in front of the ones we already have," says Lonergan, executive vice president at Visa.

SET will help the buyer and seller complete a transaction, and have it authorized by a bank. Once the transaction is handed off to the payment card company's Web site, the SET protocol is shed and the data rides as it usually would across an Amex, MasterCard or Visa private transaction processing network.

Card-issuing banks that participate in such transactions don't even encounter SET since the card payment companies deliver all authorization requests to their member banks over existing private transaction processing nets.

In some cases, however, merchant banks will take the SET feeds from the Internet and process them without the help of card payment companies.

"There's no way big banks want to see an intermediary between them and the customer," says Mack Hicks, vice president of electronic banking services for Bank of America, Inc. Many banks initially may look to credit card companies to process SET transactions, but over time, the banks "will want to maintain the relationship with the merchants," Hicks says.

Plan carefully

SET is not as clean to implement as its original authors may lead merchants to believe, some industry watchers say.

One issue that the standard is silent on is how a merchant's order entry system wakes up the SET client program on a buyer's PC in order to launch a payment transaction, according to Larry Stewart, chief technology officer for Open Market, Inc., a Cambridge, Mass., Internet software developer.

As a result, merchant system vendors such as Open Market will have to devise their own messages that jump-start transactions. That, in turn, raises the possibility of interoperability snafus with browsers from Microsoft, Netscape and other companies that support SET.

"You're going to have to be careful to make sure your [Web software] supplier provides the adequate code to get the different SET-compliant products to talk," Stewart says.

Another possible nightmare for merchants may be integrating SET products with internal order entry transaction systems. Because SET doesn't reveal the buyer's bank card account information to the merchant, internal systems that rely on a buyer's card number may come to a screeching halt.

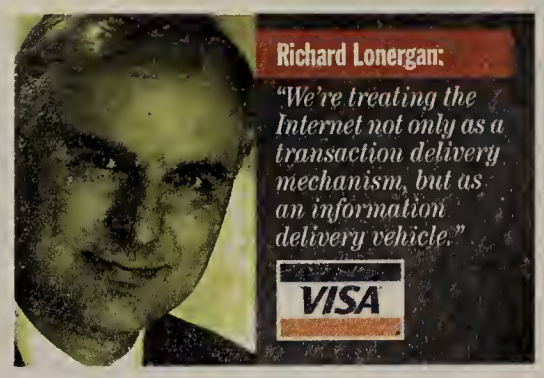
Some merchants will be able to skirt the issue, Stewart says, by asking card payment organizations to reveal the card numbers to them. "This would be done presumably for large and trusted merchants," Stewart says.

In addition, SET currently lacks the capability to handle installment payments — where a merchant would bill the buyer in small increments over a period of time.

All for one

Despite the initial hurdles, the big three card payment companies are relying on SET to drive electronic transactions, which they expect to grow at a steady clip.

MasterCard's Mott estimates that 90% to 95% of the merchant transactions flowing across the Internet today are credit card-based, accounting for $300 million in transactions last year; by many accounts, that figure will double this year.



"The initial gains [with SET] will come from business because they are tooled up, wired up and disposed to buying things on a remote basis," MasterCard's Mott says.

To take advantage of that, MasterCard is exploring the possibility of an online version of its commercial purchasing card. The product allows businesses to purchase products from suppliers and maintain a detailed log of transactions.

"This would be a valuable instrument for business-to-business purchasing online," Mott says.

Because each of the big three will standardize on SET to provide a common look and feel for processing electronic transactions, they are looking to their Web sites as the primary means to differentiate their products and services.

Originally, these Internet sites served to communicate corporate missions. Now they are being transformed to host electronic malls and to support business-to-business network services and other offerings that help create a community between buyers and sellers.

MasterCard believes Web differentiation lies in providing buyers with decision support tools to make informed decisions, helping buyers find the items they want to purchase, and ensuring that order fulfillment is done quickly.

MasterCard also has struck deals with about eight computer networking providers, although Mott talks publicly only about the company's relationship with Verifone, Inc. and Hypercom, Inc.

The deal with Verifone, announced last August, focuses on development in four areas: debit cards, smart cards, cardholder loyalty programs, and so-called electronic wallets — essentially a form of a smart card designed to dispense electronic cash. The Hypercom relationship aims to promote electronic payments in Latin America and the Caribbean.

With regard to member banks, Mott says MasterCard is putting in place a number of intranet services — file transfers, E-mail service, publication of manuals and bulletins — to help its banking partners disseminate information internally.

"We are working up the functional mechanisms so that this can be done securely and efficiently over the Internet," he says. "And we're putting in place the educational processes to let our member banks know what investments they have to make and what changes they'll need in their communications architectures."

The thinking is that this type of electronic commerce service will help MasterCard better position itself against rival Visa. "Our members don't want to go down a blind alley chasing a technical solution that turns out to be ineffective," Mott says. "We can help them establish a presence on the Internet."

On the consumer side, MasterCard is retooling its Web site to establish electronic malls and other buyer services to attract consumers. For example, the company is offering advice on managing health care costs and selecting doctors — features that will make its site useful to consumers, Mott says.

Another example is an ATM locator application that will allow users to plug in a city name and street location to find the nearest ATM machine. "That's a slam dunk application that will keep users coming back," he says.

Dress rehearsal

Visa also believes in building an online community for buyer and seller. Its Visa Expo homepage now lures users with a shopper's plaza, special events forum, travel planner and financial advice.

The biggest challenge Visa now faces with electronic commerce is the broad spectrum of services that must be addressed. "You have to understand how this will work with America Online, and interactive television — not just the Internet," Visa's Lonergan says. "My guess is shopping on the Internet will be nothing more than a rehearsal for shopping over your television set."

With an eye toward the business community, Visa believes it can develop services that attract its member banks to offer services from the Visa home page or even using Visa-developed applications.

Visa is trying to build brand awareness with its Visa Expo home page, stocking the site with services and advice that buyers need. "We can be the jumping-off point for banks," Lonergan says. But, he adds, the company's Visa Interactive business unit will be the focal point for banking services.

On the business services side, Visa is more coy about its intentions. Lonergan says the company is approaching electronic commerce from the standpoint of providing businesses with a wealth of

Effort aims to unite 'Net payment schemes

A working group formed by two major consortiums is developing a protocol that will enable buyers and sellers to select from among several electronic payment options when settling transactions over the Internet.

The payments services working group — sponsored by CommerceNet and the World Wide Web consortium — hopes to demonstrate the protocol this September across multiple locations on the Web.

The Joint Electronic Payments Initiative (JEPI) is exploring the technology required to negotiate the use of multiple payment instruments — such as electronic checks and online credit or debit cards — to settle electronic transactions.

JEPI hopes to provide a protocol that can be used to build a type of financial services middleware that will help merchants and buyers identify whether the transaction in question will be handled by electronic mail or by file transfer. Likewise, it will help users identify whether the transaction supports emerging protocols such as the payment card industry's Secure Electronic Transaction protocol or other payment protocols.

"[JEPI] handles the negotiation process in a standard way so vendors like CyberCash and DigiCash can support it without having to reinvent the wheel," says Tom Wills, JEPI project leader. "Ultimately, we hope this will make it easier for buyers and sellers to conduct payment transactions across the Web."

Several Internet merchants are helping the JEPI team define the user interface for the protocol. "They know more than anyone about how the shopping experience flows," Wills says. The team is looking for some input from major retail merchants who can commit resources to the project.

For further information on JEPI, contact Tom Wills at twills@commerce.net or Jim Miller at jmiller@w3.org.

— Charles Bruno

ONLINE

There's more JEPI info online at a Web page sponsored by the World Wide Web Consortium and the CommerceNet Consortium. You'll find a thumbnail sketch about the JEPI project, as well as links to sites with info on electronic payments and to vendors such as CyberCash, Microsoft, NetBill, Open Market and Verifone.

Select
then

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information about their customers. "We're treating the Internet not only as a transaction delivery mechanism, but as an information delivery vehicle," he says.

Visa is looking carefully at electronic commerce services for Europe and other global sectors. For example, Lonergan says catalog sales overseas are vastly different than in the U.S. and Visa plans to address those markets.

Visa also is looking to push electronic commerce into new territory by teaming with Carnegie Mellon University (CMU). Visa wants to tap into knowledge CMU gained with its NetBuild project, which focused on devising an online system to handle small payments — often less than a dollar — that could be charged to a credit, debit or other payment card.

"The business model is tough," Lonergan says. "You have to put in place a net infrastructure that looks an awful lot like the transaction processing model we already have in place. Who's going to pay for it? We're still trying to sort that out."

There's a good chance that Visa won't be the first to market with its electronic commerce services, says David Renard, a research analyst with Gartner Group. Experience shows that MasterCard is often first with new services, but Visa follows with a strong, more stable offering.

"Visa is going to push forward far more with the payment side of the Internet," Renard says.

We've assembled links from Network World Fusion to a wealth of resources on electronic payments, including:

- **A Visa site offering a primer on SET along with a SET FAQ and press releases documenting Visa's path to online payments.**
- **MasterCard's site, where you'll find information on the intricacies of secure electronic commerce for the masses. There's also an essay that explores the issues of electronic payment security, and offers insight into encryption, digital signature and authentication services that play a central role in the SET protocol.**
- **A pretty darn long thread of messages discussing the business and technical implications of using the SET protocol. Good stuff, particularly if you're interested in the technical nuances of using SET.**
- **Another Visa site offering copies of both the business and technical SET specifications.**

Select NetRef, Technology Resources then EDI/Electronic Commerce.

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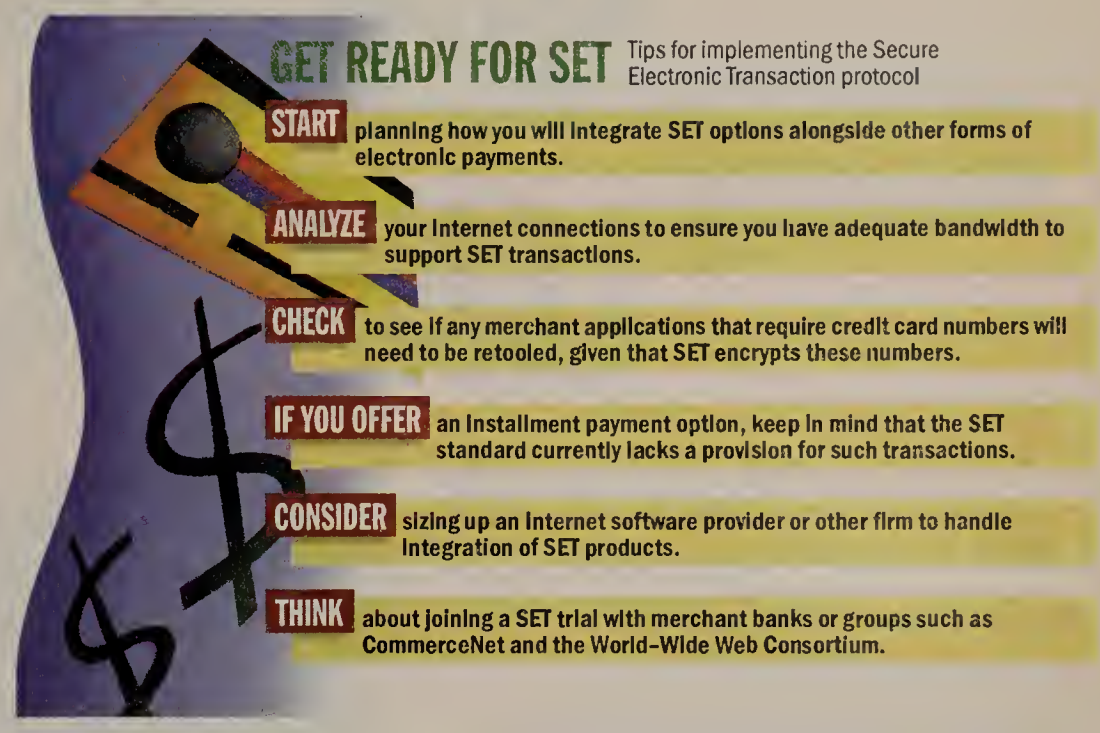

Mum's the word

American Express, meanwhile, feels it is in the unique position of serving both its cardmembers and merchants. It believes Visa and MasterCard prejudice their services by tailoring them largely to the needs of member banks.

Last July, Amex disclosed that it is working with Netscape, CyberCash, Inc., Open Market and First Virtual Corp. to provide secure transaction capabilities between card members and merchants. Bauman, Amex's vice president of business development and general manager for interactive services, would not reveal the nature of development with those companies. When the relationships were announced, Amex said it would refer customers to those vendors.

Since then, the company has said it will rely on Netscape to supply it with Internet servers. "Clearly, Netscape is an important partner to us since we're supporting their security protocol and they are supplying us with critical software we need to operate on the Web," Bauman says.

Beyond that, Amex is mum on its intentions to compete for electronic commerce business, but Bauman says there will be a number of announcements in the coming months with vendor business partners and others.

Renard.will differentiate itself with the breadth of card member analysis it can bring to the table. "To be successful here, they have to offer services as good as the others and drop their customer analysis on top of that," he says.

Being first counts

The end game for companies such as Amex, MasterCard and Visa is to establish their Web presence quickly, and to put in place and quickly stabilize the infrastructure for electronic payment transactions.

There's much work ahead, says Visa's Lonergan. Policies must be set and fee rates must be put in place.

"We don't have all the answers right off the bat," he says. That's why each of the card payment companies is busy now in a flurry of trials.

Mott agrees those issues need to be addressed, but stresses that positioning now is essential to success later. "You want to have your brands known, you want to have your capabilities understood by the public, and you want it all to be available across the spectrum of access points and distribution channels," he says.

"Once the critical mass hits, you want the buyer behavior to be trained on your system; that's why being first to market is so important here." ■

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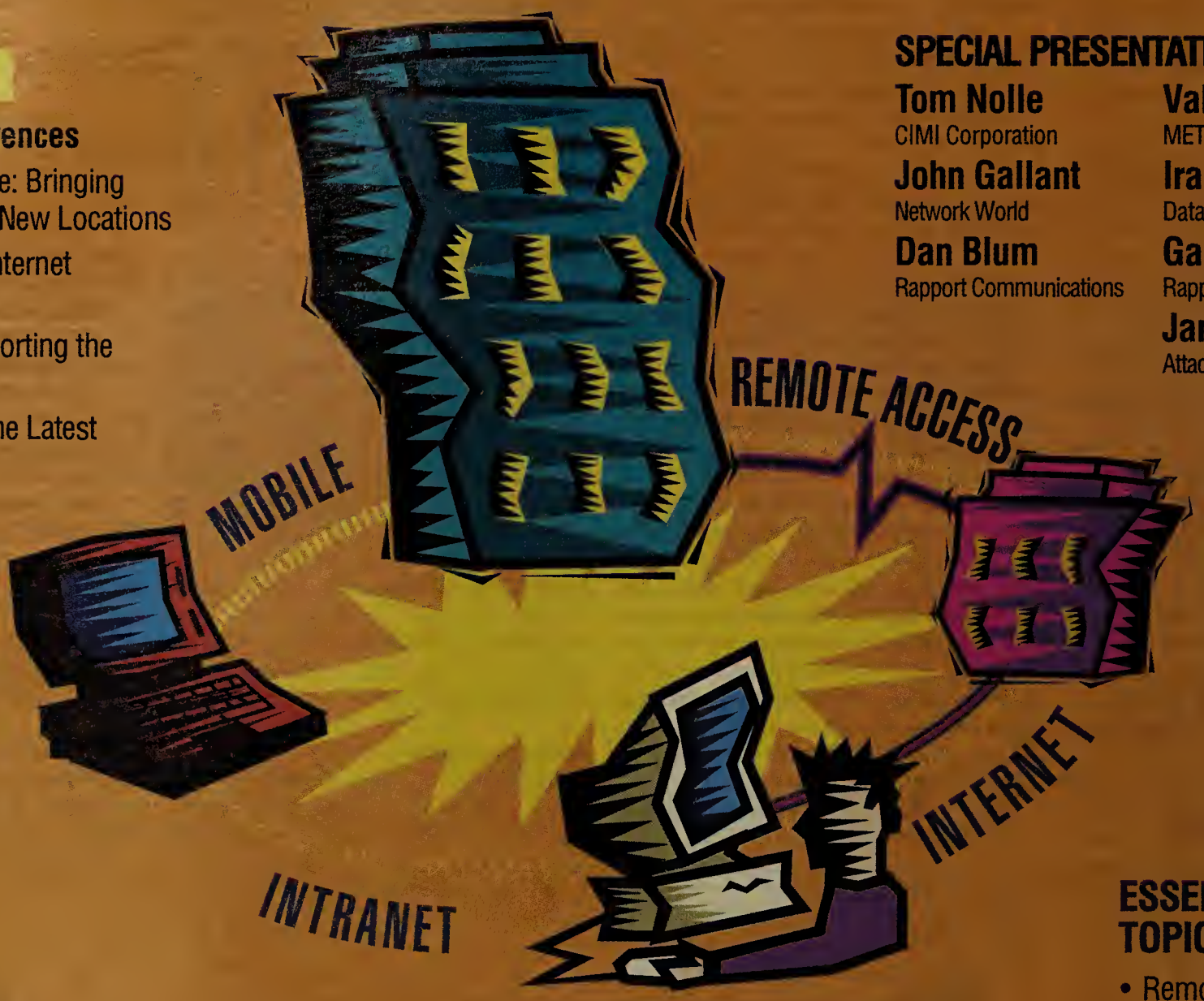

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GeoStax/E

Lowdown on low-end hubs

GeoStax/T

A look at three products from our April 1 Buyer's Guide Short List reveals that low-end does not equal easy for administrators.

By Kevin Tolly, John Curtis and Elke Passarge

While they provide the physical connectivity essential for network communications, today's hubs also offer a wide spectrum of features and functions. Low-end hubs seek to pack as many essential functions as possible into reasonably priced packages.

We invited the four vendors selected for our low-end hub Buyer's Guide Short List *(NW,* April 1, page 74) to send us their products for review. Digital Equipment Corp. declined, stating that the product we chose was not the one they promote for the uses we were testing, and Plexcom, Inc. never responded to our repeated phone calls.

Intellicom, Inc. delivered its Ethernet-only OfficeStak 5000 product. UB Networks, Inc. sent both its GeoStax/E and its GeoStax/T hubs for Ethernet and token ring, respectively. Both vendors, as requested, shipped Windows-based management software.

We looked for ease and effectiveness of management and expansion options. We did not measure performance because it is simply not possible to benchmark hubs in terms of packets or bits per second. Instead, one must think of performance in terms of available bandwidth per user, and pay close attention to the segmentation and switching options offered by the various products.

Overall, we found that these three products were stronger on delivering features than on making those features easy to configure and manage.

Even our simple tests revealed problems. When we attempted to manage UB's GeoStax/T hub, the vendor was not even sure what hardware was needed to provide management. Finally, it shipped us the mandatory, self-contained management module. Still, once running, the UB NetAssistant management application displayed devices on its network map that did not exist on the actual network.

Intellicom does not provide documentation with its OfficeStak 5000 Ethernet hub for configuring the network management software, and it definitely should because you will need it.

OfficeStak 5000

Intellicom's OfficeStak 5000 is a stackable hub that supports shared Ethernet, Fast Ethernet, full-duplex Ethernet, T-1/E-1 WAN connections and redundant power supplies. It provides cut-through switching between Ethernet modules, plus bridging and IP/IPX routing. It contains a 640M bit/sec backplane, and modules are hot-swappable. We tested a configuration with 10Base-T connections, but the hub is also available with 10Base2, 10Base5, 10Base-FL and shielded twisted-pair connections.

Like most Ethernet concentrators, OfficeStak 5000 includes autopartitioning for collisions. Autopartitioning removes a port from the network if 31 consecutive collisions are detected. However, OfficeStak will re-enable a partitioned port if a good frame is received on that port.

As tested, the front panel of the OfficeStak includes a single high-speed switching module and two shared Ethernet modules. All LEDs are located on the same side of the hub in a single bank. Although it takes a moment to associate an LED with its port, this design prevents dangling cables from blocking the view of LEDs.

To economize space, the OfficeStak's high-speed uplink ports, like the two full-duplex Ethernet ports provided in our test unit, are located on the back of the hub along with their associated LEDs. These occupy half-size slots, as opposed to the full-size slots on the front of the hub occupied

SCORECARD

	OfficeStak	GeoStax/E	GeoStax/T
Overall score	**7.4**	**4.4**	**4.9**
Features (35%)	9	5	5
Expansion (40%)	8	4	4
Installation (25%)	4	6	4

Scores based on a scale of 1–10. Categories are weighted by the percentages shown.

NetResults

Product	OfficeStak 5000	GeoStax/E and GeoStax/T
Vendor	Intellicom, Inc. (818) 407-3900	UB Networks, Inc. (408) 496-0111
Price as tested	$4,990	GeoStax/E: $1,945 GeoStax/T: $5,685
Pros	▲ Supports full-duplex Ethernet, Fast Ethernet, T-1/E-1 WAN ports, bridging, IP/IPX routing and switching. ▲ Uplink ports. ▲ Hot-swappable. ▲ Supports redundant power supplies. ▲ 640M bit/sec backplane. ▲ Autopartitioning. ▲ Stackable.	GeoStax/E: ▲ Expansion ports. ▲ Module isolation. ▲ Backup port feature. ▲ Port security. ▲ Stackable. GeoStax/T: ▲ Autowrapping ▲ Beacon avoidance. ▲ Module isolation. ▲ Easily accessible DIP switches. ▲ Stackable.
Cons	▼ OfficeStak 5000 MIBs not compiled into OfficeView management software. ▼ OfficeView displays all MIBs even if not supported by device. ▼ No documentation for configuring OfficeView to operate with the OfficeStak 5000.	GeoStax/E: ▼ No high-speed uplink. ▼ No bridging or switching between modules. GeoStax/T: ▼ Requires an additional management module for SNMP or out-of-band management. ▼ No high-speed uplink. ▼ No bridging or switching between modules. ▼ Poor LED status indicators.

by the shared Ethernet modules. This means that modules cannot be swapped front to back. As a consequence of this design, accessing the uplink ports to attach a cable or check on an LED requires walking around to the back of the hub — a nontrivial task in a crowded communications closet.

The status LEDs provide system information on power, collision status and jabbers. Port LEDs include link integrity, receive activity — but not transmit — and partitioning.

From a single network Simple Network Management Protocol connection into the hub, the user can obtain relevant information on the status of all ports and of the hub as a whole. Considering that the hub is likely to have cables emanating from both sides, this is the only efficient way to configure and manage the hub.

The OfficeStak 5000 hub can be expanded to a three-hub stack with three Ethernet modules, each using a proprietary backplane ribbon cable. The cable is accessed by unscrewing and sliding out the power supply to reveal a circuit card attached to a ribbon cable. The cable then attaches to a connector located under the cover of the next enclosure. If you need to route or switch between modules in one of the hubs, then the stack must contain a high-speed switching module.

You must configure the hub initially through the serial port. Once the unit is properly set up, you can manage it via SNMP or telnet.

The price tag of a 50-port OfficeStak 5000 totals $9,795 for what amounts to four shared Ethernet segments with cut-through switching between them. That's nearly $200 per port — rather high for shared ports. This is partly excusable in light of the integrated bridge/router functionality, a high-speed backplane and support for both LANs and WANs in a single chassis. It seems Intellicom is really targeting the modular router market as much as the hub market with this product.

Installation and configuration

OfficeStak 5000 ships with OfficeView, generic Windows-based management software based on Castle Rock Computing, Inc.'s SNMPc. After we configured the hub via the serial port, we attempted to connect to the hub inband using OfficeView.

However, OfficeView's autodiscovery function failed to locate our OfficeStak 5000 hub. Intellicom's technical support personnel told us the required Management Information Bases (MIB) for the OfficeStak were not compiled into the program before shipment. They required manual installation and configuration, including manually editing a configuration file with a text editor. Since none of these instructions are included in the OfficeView documentation, it is likely that most customers will similarly turn to technical support just to start the configuration process.

OfficeStak 5000

OfficeView suffers from another serious problem: As an all-purpose management program, it supports an abundance of features, functions and, most important, MIBs that are simply not supported in the OfficeStak 5000.

This means you will have to sort through long lists of MIBs to find those that apply to the OfficeStak and ignore many of the menu items because most do not apply. (Of course, you need to know which ones apply to the OfficeStak and which ones do not, so it's wise to keep the documentation handy.)

Once OfficeView is functioning, it displays hub statistics such as frames received, collisions, alignment errors, Frame Check Sequence (FCS) errors, runts and autopartitioned ports. It also includes port information, including physical connector type, port status and link integrity. In addition, OfficeView can display statistics for ports and services in both tabular and graphical formats. Plus, the user can define six measurements for long-term monitoring.

The event log reports are color-coded by severity. Critical events sound an audio alert, and the alarm button on the main menu turns red. To expedite identification and review of events, the event log can be filtered to search for certain entries and configured to ignore duplicate events permanently or for a set period of time.

Devices can be polled independently or as a group, and the polling interval is user-configurable by the second.

Although OfficeView provides Remote Monitoring support, the OfficeStak 5000 unit we tested did not include the necessary Standard Management RMON module.

GeoStax/T

Ironically, product name is the main attribute GeoStax/E and GeoStax/T have in common. The products are obviously from different design teams and, if the "Networth Snap 16" sticker on the rear of GeoStax/E is any indication, different companies. On the token-ring side, we tested the GeoStax/T 4200A, a 22-port stackable shared token-ring multistation access unit, in combination with the GeoStax/T 7900, a stackable token-ring management unit.

The 4200A hub is similar to an IBM 8228, the basic token-ring concentrator, in one critical way: The 4200A is a shared medium, so all devices connected to a 4200A — even if several 4200As are connected ring-in/ring-out — compete for the same bandwidth.

Unlike an 8228, however, the 4200A hub allows you to preset the ring speed through an easily accessible DIP switch in the rear of the hub. (The settings of the DIP switches are printed on the side of the 4200A.) If the 4200A detects a node entering the ring at the wrong speed, it automatically turns off that port. Similarly, the hub automatically wraps the ring-in/ring-out ports if it detects hard errors on either port. Unfortunately, this also means there is no way to tell if a port was disabled because of an error condition or if the attached device is simply powered off — both conditions result in a dark LED. NetAssistant, UB's management application, also fails to provide the information.

The 4200A LEDs and the physical ports are located on opposite sides. Adding to the confusion, the ports and LED positions do not correlate from the front to the back — they are in reverse order. For example, if you reach behind the LED for a port and pull the corresponding RJ-45 connection, you will instead have just pulled the ring-in connection. No warning of this nonintuitive LED-to-port correlation is given on the front of the unit.

LEDs on the front of the GeoStax/T also display the status of ring-in/ring-out ports, ring speed, module number and overall system status.

In addition to ring speed, the hub also supports the configuration of two other parameters via the DIP switch — module number (for a stack of managed hubs) and ring in/ring out. The latter is configurable to support devices that supply a phantom voltage and those that do not.

The GeoStax/T 4200A hub module contains neither integrated SNMP management nor a serial/console port for out-of-band management. Instead, customers must purchase a GeoStax/T 7900 management unit and NetAssistant software to configure and manage the unit. You can also perform limited configuration using the serial/console port of the 7900 without the NetAssistant software.

Extending management to additional modules involves unscrewing the cover plate on adjacent modules in the stack and attaching a connecting block between them. You can stack as many as six GeoStax/T 4200A units and manage them from a single management module at the bottom of the stack. The intermodule management runs via an out-of-band connection established when connecting the modules.

NetAssistant management software and a management module together add nearly $2,400 to the price of GeoStax/T. While a single management module can control multiple hubs, this still makes the price of entry quite high for a device that purports to be a low-end hub. For example, a managed 50-port stack would total $12,275, or $245 per port. Of course, because each module provides 22 user ports, one could handle 66 users without spending any more money for hub ports.

Installation and configuration

Simply getting the hub management software to work at all can be challenging. When we began testing, UB maintained that managing the hub did not require a management module. Only after repeated failed attempts to communicate with the hub and several calls to technical support did the vendor concede that a management module was required for virtually all configuration.

Once the proper equipment arrived, configuration was relatively straightforward. The management software, NetAssistant, automatically assigns the hub an IP address. Unfortunately, the address can only be changed later by editing a BOOTP table entry or using Xmodem

HOW WE DID IT

We tested these hubs in two ways: First, we attempted some basic management functions, including installation, hub configuration and status reporting. This involved connecting a management station to the hub using both in-band and out-of-band connections.

Next, we tested the hub's expansion capabilities, either through a high-speed uplink port or through a proprietary backplane cable. We examined each hub's backplane architecture, which affects the bandwidth available between hub modules, and their high-speed uplink ports, which can provide connectivity to other hubs or to a high-performance server.

Since vendors of low-end products rarely send engineers on-site to configure the products, we requested that no special help be given to us. Further, in an effort to create a realistic customer scenario, we did not allow the hubs or network management to be preconfigured.

A perspective on hubs

Providing, as it does, the physical connectivity essential to communications, the hub is the essential building block of networking today. Yet, as common as the hub is, it almost defies definition. The most primitive, monolithic, unpowered, unmanaged eight-port token ring multistation access unit and a 17-slot multitopology behemoth outfitted with redundant power supplies and controllers and managed via a high-powered SPARCstation are both, technically, hubs. And between these two extremes can be found almost limitless gradations in features and functions.

The products covered in this evaluation implemented different visions at the low end of the spectrum. The UB Networks products offered basic functionality across both major LAN topologies using fixed function stackable technology. The Intellicom product offered more advanced features, such as switching and WAN connectivity, for a single topology based on a three-slot modular chassis.

Given the differences in the products' design objectives, we can't declare a winner. Rather, each product must be judged individually.

— Kevin Tolly, John Curtis and Elke Passarge

through the console port.

NetAssistant allows you to view the status of individual ports, including the media access control (MAC) address of the attached device and frames-per-second counts, as well as global statistics such as beacon conditions and FCS. It also reports power status, temperature and uptime of each hub in the stack.

NetAssistant includes an MIB browser with on-screen definitions, which displays the MIBs supported for that device. Event logging supports user-configurable color coding by severity and a utility for sorting the log based on date, time, severity or other criteria. Definitions for critical events are provided, and NetAssistant can even suggest how to correct some errors.

Each device can be polled individually or as part of a group, and the polling frequency is user-configurable in minutes.

GeoStax/E

GeoStax/E is a stackable 16-port shared Ethernet hub. It supports expansion ports for BNC, attachment user interface (AUI) and Fiber Optic Inter-Repeater Link (FOIRL) Ethernet connectors, but no high-speed uplinks. It has management intelligence built in to each module so, unlike GeoStax/T, GeoStax/E does not require a separate management module.

Network World Fusion

For a complete look at the products in our recent low-end hub Buyer's Guide, link to Network World Fusion. Select NetRef, Buyer's Guides and Reviews, then Low-End Hubs.

(http://www.nwfusion.com)

GeoStax/E, unlike its token-ring counterpart, has 10Base-T ports located on the same side of the unit as the LEDs. Clearly, some customer confusion will result when both products are used in the same environment.

GeoStax/E shares one significant limitation with GeoStax/T: It can be expanded only by connecting concentrators together via external cables to form a larger LAN; there is no integrated support for bridging or switching between LANs. Given the industry's strong movement toward Ethernet switching and the falling prices of switches, many customers will find it difficult to justify the purchase of a stack of shared Ethernet concentrators.

Like GeoStax/T, GeoStax/E is managed by NetAssistant, which can control all modules in a stack — even modules that have been isolated from the others through management. UB claims that such isolation is a useful feature for segregating the network into smaller collision domains. In fact, it represents little more than islands of connectivity managed from a single platform, while today's customers generally consider any-to-any connectivity to be standard.

Furthermore, UB has married its software to an IP stack from NetManage, Inc. that supports only one adapter per PC. This means customers with a heterogeneous network environment of token ring and Ethernet will be unable to manage their LANs from a single NetAssistant station outfitted with both a token ring and an Ethernet card. Instead, they will need to install either a pair of PCs — one for token ring and one for Ethernet — or a token ring-to-Ethernet router to provide the requisite connectivity.

The LEDs on GeoStax/E are somewhat more detailed than those on GeoStax/T, indicating the status of power, network segmentation, collisions, media expansion ports and user ports. In addition, port LEDs display information on partitioning, link state and receiving state.

GeoStax/E also features a backup port feature through which one port can become active to backup another failed or disconnected port. Backup ports can be used to connect concentrators as part of a larger LAN and to provide redundant links to mission-critical servers. However, if the primary port becomes active again, it is not automatically reinstated. That can only be accomplished through network management.

In addition to NetAssistant, the hub supports BOOTP, File Transfer Protocol,

SLIP/Trivial FTP and Xmodem, and firmware upgrades can be performed through any of those connections. For security, GeoStax/E allows you to validate the MAC address attempting to use a port. If a station other than the one authorized attempts to enter the network through a port, the hub can be configured to disable that port. The port can then be re-enabled only through the management software.

GeoStax/E can be expanded in several ways. First, the hub includes a crossover port to allow connections between as many as 10 hubs via a standard 10M bit/sec Ethernet connection. Of course, this increases the number of stations on the LAN and significantly increases the likelihood of collisions. By setting a switch, the hubs can be isolated from one another and still be managed by the same station. The hub includes an optional media interface for different physical connections, including BNC, AUI and Straight Tip for FOIRL. But the hub lacks any high-speed network uplink options.

A 50-port managed Ethernet network comprising GeoStax/E modules, including software, would cost $5,395, or more than $100 per port.

Installation and configuration

During our initial attempts, the NetAssistant management software failed to communicate with the hub. UB subsequently informed us that some of the required software was not shipped with the hub. We had to download a file from the UB FTP server, copy it to the management station, compile the MIBs, manually add GeoStax/E to the NetAssistant device map and then reboot the hub.

Once installed and operational, NetAssistant provided information on port statistics, frames, bytes, alignment errors, FCS errors, collisions, runts, hub and port status, and more. NetAssistant provides many of the same features for GeoStax/E as it does for GeoStax/T, including event logging and MIB browsing.

To make hub configuration more intriguing, GeoStax/E exhibits the unusual ability to generate icons on the NetAssistant network map for devices that do not exist. UB calls these icons phantoms and recommends manually deleting them. Strangely, even after killing one phantom, other ghosts continue to appear at random intervals and require similar deletion. Although this feature would doubtless make an entertaining computer game, it's troublesome as a network management tool.

Configuring port security (assigning a MAC address to a port) is another procedure likely to precipitate a call to technical support. The documentation only describes setting port security through the assignment of an SNMP MIB, yet provides no information on the location of the appropriate MIB in the hierarchical menu structure of NetAssistant.

Summary

UB GeoStax is most appropriate for small, isolated token-ring or Ethernet networks with only moderate bandwidth requirements. In most cases, networking the hubs together requires extending the size of the LAN and, therefore, reducing the available bandwidth per user. GeoStax is also appropriate for environments with only a single topology and no internetworking requirements because the hubs do not include any integrated internetworking function, and managing both token ring and Ethernet requires installing two management stations.

By contrast, the Intellicom OfficeStak, with its available modular high-speed uplink ports plus integrated switching and routing, is ideal for higher performance environments with LAN and WAN internetworking requirements. ■

The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 43.

World TEST ALLIANCE

Tolly is president and CEO, Curtis is a senior engineer/analyst and Passarge is an engineer at The Tolly Group, a strategic consulting, independent testing and industry analysis organization in Manasquan, N.J. For more information, visit The Tolly Group Web site at http://www.tolly.com, call (800) 933-1699 or send E-mail to ktolly@tolly.com.

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Briefs

■ *Disaster recovery firm* **Strohl Systems** *has published* The Business Continuity Planning Guide *for companies that are developing their first recovery plan. The book provides an overview of Strohl's five-phase methodology for developing* **business continuity plans.** *The five phases are prevention, response, recovery, resumption and restoration. Topics addressed in the guide's appendices include suggestions for how to model the development of a recovery plan, and how to assess and respond to network threats.*

The guide is available now for $125.

■ *Strohl's* **Business Continuity Education division** *will offer a pair of* **seminars** *next month. One, on June 17 in King of Prussia, Pa., will provide an overview of how to develop a disaster recovery plan and will cost $495. The other, on June 24-26 in San Francisco, will provide a more detailed look at the process and will cost $995.*

Strohl Systems: (800) 634-2016.

Internet training wheels start turning at Novell

By Ram Tackett

As more businesses draw up strategic plans for using the Internet and corporate intranets, you have to wonder who will train all the technical people responsible for making it happen.

The answer is quite simple. All major software, hardware and training vendors will soon be peddling their own Internet vision and educational tools, or attempting to reshape themselves as Internet specialists.

Take Novell, Inc., for instance. With a multitude of Internet sites already using NetWare, Novell is now providing Internet instruction. Microsoft Corp. and Learning Tree International are among the other firms offering Internet training (see graphic).

How does Novell plan to bring its 85,000 Certified Novell Engineers (CNE) and other users up to speed on Internet technology? The company last month started offering two courses in basic Internet and intranet technology and plans to offer another this summer.

Course 652, Understanding and Applying Internet Concepts, gives students an overview of the Internet and intranets from a user's perspective. This course is geared toward LAN administrators who need to quickly get up to speed on such basic stuff as what a World-Wide Web browser is, what a browser does, the structure of URLs and some of the most efficient ways to get connected to the Internet.

Course 654, Web Authoring and Publishing, was designed for a mid-level, nontechnical audience. You don't need to be a CNE, but a basic understanding of the Internet is a must. This two-day course covers converting documents to HTML, HTML links and features within HTML.

A course in development, NetWare Web Server Installation and Configuration, will be for technical people and is designed to help students set up and maximize Novell's NetWare Loadable Module-based Web Server. This course should be available in July or August.

Not all 1,450 Novell Authorized Education Centers (NAEC) worldwide offer the courses yet, although most NAECs expect to have them ready to go before year-end.

These courses are either instructor-led or self-study. Novell is investigating other formats, such as computer-based training or distribution via the Internet.

"If our students want and demand it, we'll do it," says Gary Clark, director of certification and authorization programs at Novell.

"The Internet and the intranet will have significant presence in the market," Clark notes. "They're changing our industry quickly, with vendor after vendor instituting some type of Internet strategy."

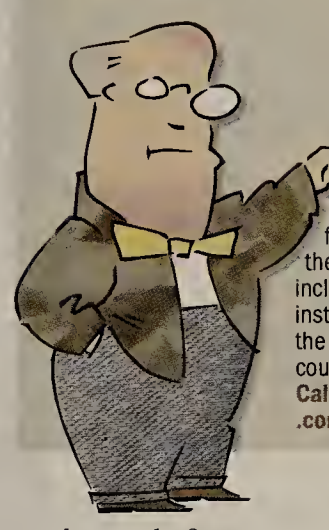
Tackett is an industry analyst at Currid & Co., a Houston-based technology consulting firm. He can be reached via the Internet at tackett@currid.com. or by phone at (713) 789-5995.

MORE INTERNET TRAINING

In the past few years, novel ways of getting Internet instruction have cropped up. Here are a few examples.

■ Attachmate Corp., of Bellevue, Wash., is teaming with other vendors, including Microsoft Corp., to offer free half-day instructional satellite telecasts on Internet and intranet technologies. The next satellite telecast, which you can downlink to your facility, is set for May 22. For those lacking a satellite dish, the broadcast can be viewed at 30 facilities in North America.
Call (800) 700-4290 or visit http://www.attachmate.com/mom/mom2.htm.

■ Microsoft Corp. is providing more traditional Internet instruction via the Microsoft Online Institute (MOLI). Courses include Web authoring and design, as well as Internet application development.
Visit MOLI at http://moli.microsoft.com.



■ Microsoft has also announced an Internet specialist program aimed at training its 11,000 resellers.
Visit http://www.microsoft.com/sp/spin/inetspec.

■ Training firm Learning Tree International offers an Internet Certified Professional Program designed to train IT professionals in all aspects of the Internet – from choosing the best connection option to utilizing the full range of Internet resources and services. Training includes developing a Web site, working with TCP/IP and instruction on Internet security. The certification requires the completion of four core and one elective Learning Tree courses and exams.
Call (800) 843-8733 or visit http://www.learningtree.com/9511/us/usnetrel.htm.

CONFERENCE PLANNING

CONFERENCE: PC Expo
WHEN: June 17-20
WHERE: New York
SPONSOR: Blenheim Group USA, Inc.
CONTACT: (801) 655-8024

This year's show includes conferences covering Internet and networking issues in addition to a menu of desktop, management and new technology topics.

The WEB.X conference will showcase Internet business applications and help attendees understand how to build their own Web server, home page and intranet. Other Internet topics include Web site management and security, publishing and advertising on the Web, and the Java programming language.

The Networks Expo conference will feature a collection of sessions covering client/server, mobile computing, interoperability, net management and security.

You can take your pick from full- and half-day tutorials on topics that range from groupware, client/server and NetWare to Windows 95, the Internet, intranets and LAN management.

On the show floor, the Mobile Office & Wireless Communications Pavilion will feature the industry's latest in notebook, docking and palmtop computers, electronic mail, hardware and software.

At the ISDN Pavilion, service providers and equipment vendors will provide information about the products, applications and advantages of this high-speed service.

The full conference fee is $600. The cost for a full-day tutorial is $500; a half-day tutorial costs $250.

• • •

CONFERENCE: SuperComm '96
WHEN: June 23-27
WHERE: Dallas
SPONSORS: United States Telephone Association and the Telecommunications Industry Association
CONTACT: (800) 278-7372

This show includes primers on network switching, transmission systems, fiber optics, wireless communications, cellular, personal communications services, satellite networks and multimedia applications.

Of special interest will be the Public Policy Workshop examining the Telecommunications Act of 1996. In a plenary session, carriers, as well as hardware and software makers, will examine hybrid fiber and coaxial technologies, and advanced switched digital video. They will also examine how improvements in computing power and software capabilities will affect the industry.

There will be special programs running concurrently with SuperComm, including one from the International Communications Association (ICA) users' group. Participants can attend sessions on collaborative computing, client/server architecture, electronic data interchange, commercial uses of the Internet, LAN/WAN internetworking and management, high-speed LANs, broadband technologies and help desks.

SuperComm exhibits, as well as plenary, primer and workshop sessions, are free. There will be a $50 charge for registrations after May 24. The ICA program fee ranges from $225 to $1,300.

ONLINE

More conference info can be found on Network World Fusion.

http://www.nwfusion.com

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Network Management Software Engineer

You will design and implement network management applications in various Windows and UNIX systems. A BS/MS Degree in Engineering or Computer Science with 1-10+ years application development experience is essential. C++ experience is a plus. **(CRD01)**

Design Qualifications Test Engineer

Your BSEE or BSCS Degree and 3-6+ years of networking experience is critical in this position where you will be developing and creating test platforms for product regression/stress testing. Knowledge of communication & routing products, UNIX systems and C/C++ experience is essential. **(CRD05)**

IP/IPX Router Development

These 2 positions require experience with software development & implementation on IP or IPX Routers. The IP candidate should have an MSCS or equivalent plus 1-10+ years "hands-on" experience. The IPX candidate should possess a BSCS or equivalent and 2-8+ years of technical industry experience. **(CRD6/7)**

Senior Software Engineer (TelCo)

This high-level software engineer/architect with 7+ years experience will have a background in products such as T1/T3 muxs, primary rate ISDN or other telco/Internet networking products that use high-speed data technologies. Must be proficient in real-time "C" embedded development. **(CRD12)**

Embedded Systems Development

Your LAN development background as well as your experience with PPP, RADIUS and SNMP will be critical in this position as you develop software for the network access server. MSCS or equivalent and 1-10+ years experience is essential. **(CRD15)**

Wireless Gateway Software Engineer

The software product developer with two or more years experience in tele/data communications is right for this position. Experience with cellular and/or wireless communications is essential. C++ and OOD a plus. **(CRD19)**

Application Server Development

The experienced Novell NetWare NLM Programmer is right for this position. Experience with IP & IPX network protocols is essential as well as a BS EE/CS. **(CRD22)**

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Support Analyst: Perform Novell Network administration including User Code add/change/delete, software upgrade/installation, hardware upgrade/installation, system backup and restoration. Real Estate software application support including file maintenance, user problem resolution. UNIX operating system maintenance for system software modifications and upgrades, backup, and restoration analysis for PC and Network hardware and software. Basic and C++ programming for Real Estate application conversion. Develop user documentation and participate in user training. Position requires bachelor's degree in Computer Information Systems and 6 mos. prior experience in this position or in Network Administration. Prior experience must include experience in Novell network installation and administration, UNIX platforms, and installation and configuration of network software on file servers and workstations. 37.5hrs/wk; 8:30am-5:00pm; salary of $30,000.00/yr. Send resume with Social Security No. to Indiana Dept. of Workforce Development, 10 N. Senate Ave., Indianapolis, IN 46204-2277, Attn: Gene R. Replogle. Include ID#3379676 with response. Applicants must be eligible for permanent employment in the United States.

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Please apply enclosing your resume to: **Kevin Morrison, President, C-C-C (USA), Inc., 1227 Old Walt Whitman Road, Melville, NY 11747. Tel: 516-547-8888 - Fax: 516-547-5566.**

Programmer Analyst: Design and develop Client-Server architecture based on Manufacturing, Financial and EDI applications; coding in SYBASE, APT, and SQL; writing UNIX and AWK scripts for maintaining SCCS; and interfacing with mainframes using OMNI Netgateway. Position requires B.S. degree in Computer Science and 6 mos. prior experience in this position. Must have working knowledge of OMNI Netgateway, SCCS, and EDI. Prior experience must include experience developing MRP II applications and in performance tuning and database administration. 40 hrs/wk; 8am-5pm; salary of $35,000.00/yr. Send resume with Social Security No. to Indiana Dept. of Workforce Development, 10 N. Senate Ave., Indianapolis, IN 46204-2277, Attn: Gene R. Replogle. Include ID#3379680 with response. Applicants must be eligible for permanent employment in the United States.

Senior Systems Analyst: Customize software for a financial management accounting package and other packages using NT SQL server database; document applications, upgrade software, establish procedures and guidelines; coordinate activities of information management staff; install and maintain Novell Netware Systems and peripherals; train personnel in use of system applications and software; establish wide area network with universities via Internet. Position requires M.S. degree in Computer Science. In completing education, must have acquired working knowledge of SQL*Plus, PostScript, and Oracle database tools, and installing Novell NetWare. 37.5 hrs/wk; 7am-3:30pm; salary of $19.52/hr. Send resume with Social Security No. to Indiana Dept. of Workforce Development, 10 N. Senate Ave., Indianapolis, IN 46204-2277, Attn: Gene R. Replogle. Include ID#3379681 with response. Applicants must be eligible for permanent employment in the United States.

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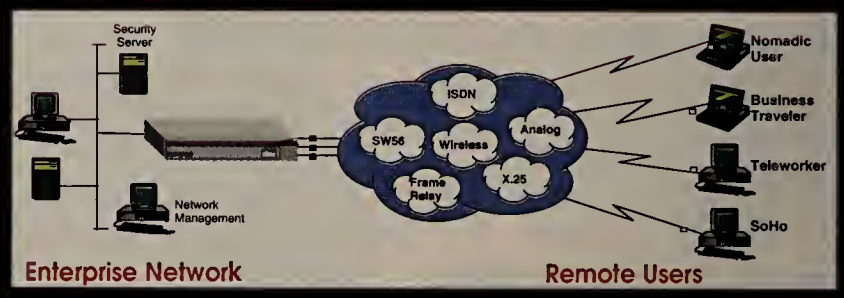

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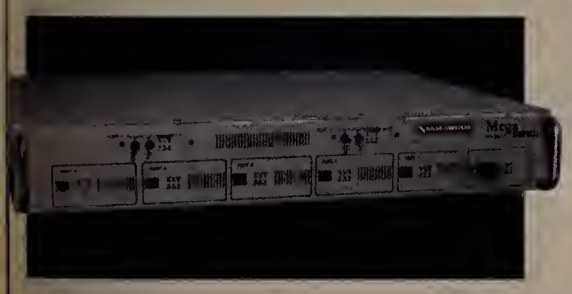

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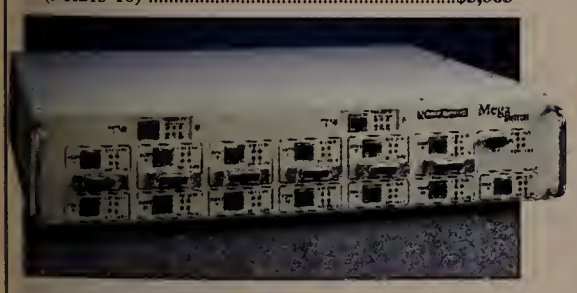

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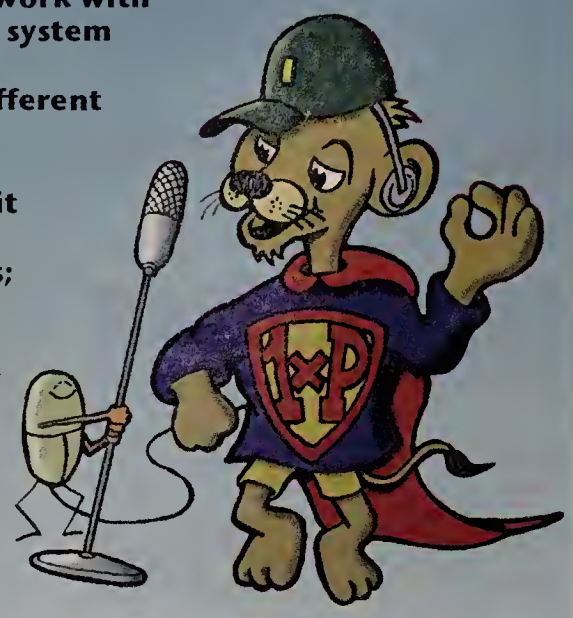

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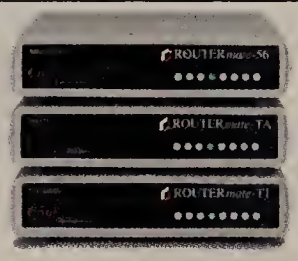

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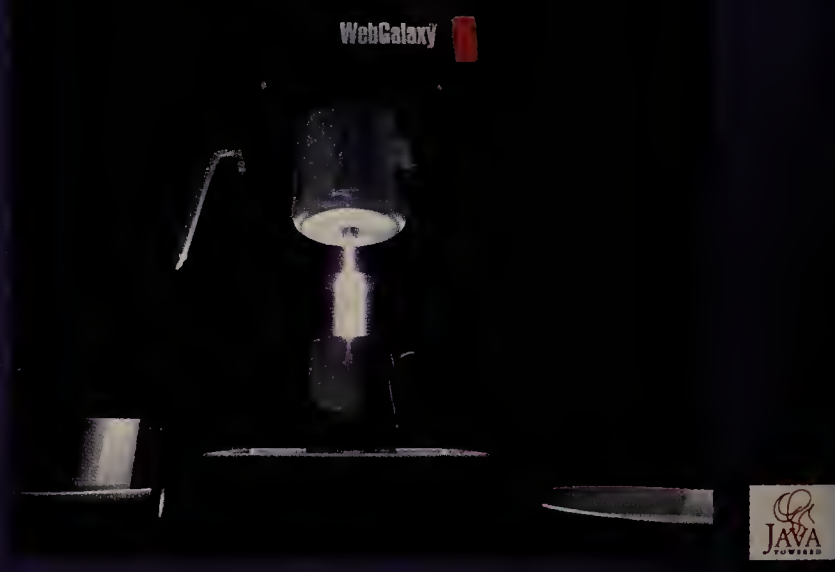

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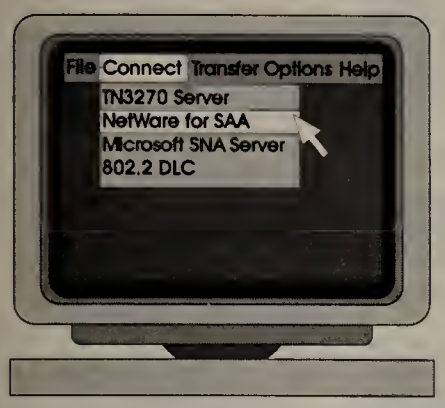

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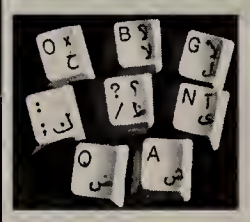

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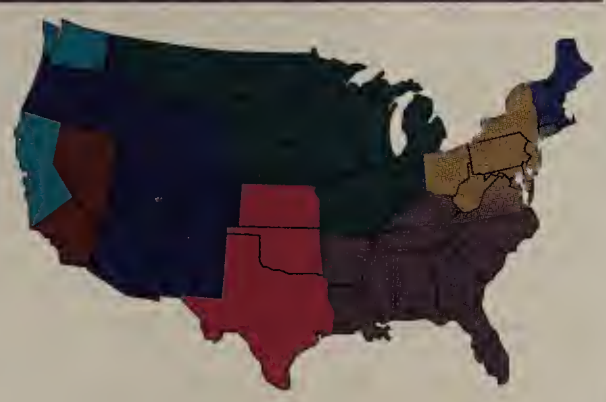

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DIRECTORY OF SERVICES

Rochester

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local loop to competitors. That move made Rochester the nation's first open market for phone service.

So when Schauseil, the manager of telecommunications for Blue Cross/Blue Shield of Rochester (BC/BS), went shopping for one carrier to handle all his telecommunications needs, he had a choice.

Ultimately, Schauseil negotiated an agreement with Frontier Corp., the unregulated entity that has as a subsidiary Rochester Telephone, the regulated local exchange carrier.

When Schauseil cut the deal last spring, the Rochester open market was mere months old and real competition hadn't yet materialized. In an effort to seal up BC/BS's business, Frontier put together an attractive bundle of local, long-distance, cellular and private-line services anyway.

Time Warner's *Burr promises cable modem 'Net access in near future.*

Schauseil thought the offer was good enough to dump two of his former service providers — AT&T long distance and Cellular 1 cellular — and to sign on for two years with Frontier. Then Time Warner Communications of Rochester, the local cable TV provider, stepped in as a local exchange carrier offering even lower rates.

Frontier reacted by ripping open Schauseil's two-year contract and slashing prices: Long distance came down an extra 27%; cellular, 11%; and local service, 9%. Frontier is also working on a proposal to beat Time Warner's offer of a flat rate for local metered service that is typically billed by the minute.

"They haven't closed the door yet on anything," Schauseil said.

THE PRICE OF FREEDOM

To enter the Rochester open telephone market, Frontier Corp. agreed to a $21 million rate reduction over seven years and no increases in residential or business phone service.

Telecom test tube

Since the open market experiment began, the main competitors have been Frontier, AT&T, Time Warner and Citizens Telecom.

AT&T, the long-distance giant that came into the local market as a reseller of local telephone access, has all but dropped out of the residential market, grousing that it cannot make a profit because of the paltry 5% wholesale discount Rochester Telephone offers on local access. AT&T has an appeal in with the PSC. And recently, it decided to resell some local access from Time Warner.

Citizens Telecom also resells local service as well as paging and cellular services, bundled with its own long-distance service.

But Time Warner has come on strong, undercutting Rochester Telephone prices in areas where it competes between 10% and 30%, depending on the service. With its own fiber/coaxial cable network in place locally, Time Warner is not hemmed in by profit margins set by Rochester Telephone's wholesale price.

Time Warner has 13 Synchronous Optical Network (SONET) rings in place as its local backbone, so it offers direct fiber links to large corporate users at discounted rates. Rochester Telephone's SONET deployment, in contrast, lags far behind with only two completed rings.

The University of Rochester has bought some T-1s and fax and Centrex service from Time Warner over its SONET fiber at significant savings. Beyond the price, John Tompkinson, a senior network engineer for the university, said he likes the superior performance of fiber over that of copper and the inherent redundancy of SONET rings.

No answer on local dial tone

Time Warner's impact on local residental phone service has been less dramatic. The company will not say how many customers it has signed up, but they are restricted to a limited number of apartment buildings where Time Warner is trialing equipment and working out the problems of providing residential telephony.

In fact, Rochester Telephone says the competitors' inroads into local dial-tone service is between 3% and 4%, most of that snapped up by AT&T during its short-lived push into the market.

PHIL MATT

Rochester Tel's *Gutstein predicts faster rollout of new services.*

Time Warner's progress in the local dial-tone area is slowed by difficulties upgrading a cable TV network to telephony standards and by the immaturity of the hardware.

"The in-home technology is being developed as we speak," said Ann Burr, Time Warner's president in Rochester. "It's difficult to move as fast as we would like."

Still, Burr said the company is promising to start deploying cable modem Internet access service offering up to 10M bit/sec by the end of this year or early next.

Time Warner's rapid move into the market for large corporate users has been a wake-up call for Rochester Telephone, according to company President Denise Gutstein.

Rochester Telephone is installing more fiber in SONET rings; looking for a partner, perhaps a wireless provider, to compete against cable TV offerings; and researching a way to deliver high bandwidth to the home over its existing wires.

The company is also consolidating its central offices from 20 to five, meaning decreased costs and faster rollout of new services.

Gutstein said pressure from Time Warner has not only accelerated Rochester Telephone's efforts in those areas, but also has made Frontier more flexible in negotiating deals with users.

Bundling services, such as the Frontier package worked out for BC/BS, is now more common because of competition. "That forces a different consideration when the customer has more options compared to a year ago," Gutstein said.

And that's something Schauseil can enjoy. "They appear open and willing to discuss anything to keep you as a customer," he said. ■

Competition means few choices

After rival carriers duke it out in local telephone markets, most major cities will find themselves with just three competitors left, according to Ivan Seidenberg, NYNEX Corp.'s chief executive officer.

NYNEX's *Seidenberg says in the end, most major cities will have just three competitors to choose from.*

Cities like New York will have two wireline carriers and one wireless carrier, and smaller markets will support just one wireline carrier and one wireless carrier, Seidenberg said last week.

Competition will force carriers to accelerate technological improvements and encourage faster deployment of new services, he told about 250 executives from telephone and cable television carriers at a Bell Communications Research forum in Naples, Fla.

Seidenberg, who has been tapped to eventually take over the merged NYNEX and Bell Atlantic Corp., said the marketplace will seem crowded, but most players will actually just retail services they buy from one or two owners of the underlying networks. Each successful competitor will have to focus on services users want — not on those the carriers might think they want. "We've done projects that were great stand-alones, but they didn't meet customer needs," Seidenberg said.

— Tim Greene

Token ring

Continued from page 1

down to Ethernet switching price levels," said Anura Guruge, an independent analyst in New Ipswich, N.H. "The switch still doesn't support Source Route Bridging, but that's not always a necessary evil."

Source Route Bridging (SRB) helps users link large numbers of token-ring nets across an enterprise.

Manuel Kamer, a Token Ring brand manager for IBM, would not comment specifically on the $345 price but said IBM was being extremely aggressive in its pricing of the 8272. He also noted that SRB would be added to the boxes by the end of the year.

"We will continue to put downward pressure on the price per port on the 8272 because we consider it a strategic product," he said.

The leaders in the token-ring switching market — Bay Networks, Inc./Centillion, Nashoba Networks, Inc. and Cisco Systems,Inc./Madge — charge an average of $1,500 per port by comparison. Ethernet switches can be as low as $300 per port.

Priced at about $550 to $750 per port today, IBM's list prices were already lower than its competition, but because it was late to market and missing SRB, the 8272 still needs a boost, analysts said.

Competitors are evaluating the IBM price cuts and have not responded with price cuts of their own so far.

There is always discounting, but none of IBM's rivals can build products and make money at $345 per port, said one competitor who asked not to be named.

"Seems to be more an act of desperation," said Nick Grewal, president and chief executive officer of Nashoba Networks. Grewal said his firm has seen competitive bids by IBM for $345 per port but added that Nashoba would not be entering a price war at that level.

"The market is paying $2,400 to $2,800 per port in some cases, so it's hard to see the market leaders coming down all that much in price just to match IBM, which hasn't been that strong a player," Grewal said.

Because of its efforts to lead the Asynchronous Transfer Mode revolution, IBM is holding a double-edged sword when it comes to LAN switching. On one hand, it wants to be a token-ring leader, but it also wants to push ATM, a technology in which it has sunk millions of research dollars in the past few years.

"The pricing IBM is talking about [for a token-ring switch] is great, but I think that our next technological investment will be to ATM for the campus, not switching," said Ron Sanderson, manager of networking software and support for the Central Management Services Division of the State of Illinois in Springfield.

The IBM 8272 Token Ring LAN Switch family includes the eight-port Model 108 and 16-port Model 216. The company also resells the Bay/Centillion 100 backbone token-ring switch. ■

Token ring going up — and down

Overall token-ring gear shipments:
1994: **3.2 million generating $1.3 billion**
1995: **3.8 million generating $1 billion**

SOURCE: IDC, FRAMINGHAM, MASS.

ATM

Continued from page 1

ital firm that has put some of its money behind a gigabit Ethernet start-up.

Analysts said one of the most powerful forces slowing ATM's acceptance is the development of enhancements to existing Ethernet technology that can provide many of ATM's speed and quality of service (QoS) advantages (see graphic).

In fact, ATM Forum President Stephen Walters admitted that ATM may not dominate the LAN, calling into question the forum's model of end-to-end ATM networks.

But some attendees said it is premature to write off ATM in the LAN. "I just don't see things so black and white. It's too soon to declare technology winners or losers," said Martin Taylor, vice president of network architecture for Madge Networks, Inc.

Rival technologies keep ATM out of key areas

ATM is not going to break into the desktop or LAN workgroups any time soon.

	1996	1997	1998
Desktop	10M bit/sec Ethernet	10M/100M bit/sec Ethernet	100M bit/sec Ethernet
LAN workgroups	Switched Ethernet	Switched Ethernet	Switched Fast Ethernet
Campus backbone	FDDI	155M bit/sec ATM	622M bit/sec ATM

SOURCE: MCQUILLAN CONSULTING, CAMBRIDGE, MASS.

Even in the campus backbone — where ATM was once thought to be a no-brainer — industry observers said gigabit Ethernet poses a threat. "If gigabit Ethernet comes in at half the price of 622M bit/sec ATM, it will get 10 times the volume," said John McQuillan, president of McQuillan Consulting in Cambridge, Mass.

Ed Kozel, chief technology officer for Cisco Systems, Inc., agreed that gigabit Ethernet has a good shot of winning the campus backbone battle. In a presentation about the future of ATM networking, he predicted that gigabit Ethernet would hold the advantage over ATM in terms of cost and overall simplicity.

"When desktops are constipated, there's not a lot of discussion about what technology is the right technology," he said. "People just want relief."

Attendees also peppered panelists with questions about other ATM alternatives, including IP switching and CIF.

Frustrated with the slow standards process for determining how to run IP over ATM, showgoers crowded start-up Ipsilon Networks, Inc.'s booth to see its new IP switch, which combines IP routing software with ATM switching hardware. But some industry observers said customers will steer clear of Ipsilon's proprietary approach and wait for the ATM Forum's MPOA standard, expected in 1998.

A session on CIF filled hundreds of seats in a large auditorium, as attendees came to hear an information technology specialist from Cornell University talk about this technology for adding ATM QoS and flow control capabilities on top of Ethernet-attached workstations and Ethernet switches.

A CIF specification was expected to be approved by an alliance of vendors late last week, which means products may soon be on the way.

"Our plan is to go with switched Ethernet over the next three to five years, so CIF could fit nicely into our plans to give us some better quality of service capabilities," said a net manager for a large Southwestern insurance company who asked not to be named.

But observers pointed out that CIF may wind up requiring customers to swap out their adapter cards anyway to support new drivers, and that would defeat the purpose of the technology as a less expensive, easier way to get ATM-like services.

One industry leader tried to put things in perspective.

"Despite the undercurrent of ATM alternatives and backlash at the show, ATM is a growing market," said Eric Cooper, chairman and chief executive officer of Fore Systems, Inc. ■

Postponing the need for ATM

Evolutionary LAN technology is slowing ATM's acceptance.

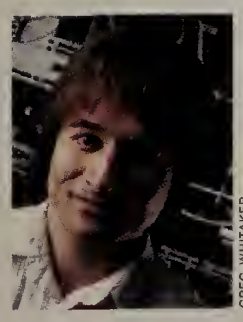
Advantage of ATM	How to obtain it without abandoning Ethernet
▶ Higher speeds	▶ Fast Ethernet or gigabit Ethernet
▶ Dedicated bandwidth	▶ Switched Ethernet
▶ Isochronous support	▶ Isochronous Ethernet, IEEE 802.9 or 3Com's PACE technology
▶ Better management	▶ Virtual LANs
▶ Multicast and bandwidth reservation	▶ Enhanced protocols such as IPng and RSVP

SOURCE: MCQUILLAN CONSULTING, CAMBRIDGE, MASS.

Net mgmt.

Continued from page 1

sons for migrating toward a Web-based management strategy is that the Web is easy to use, familiar and portable. It is also easier to recruit employees who know Web technologies such as PERL and the Common Gateway Interface programming tools than it is to find and keep OpenView experts, Robel said.



GREG WHITAKER

Indiana University's *Robel is moving management to the Web.*

Indeed, users are increasingly sizing up the Web for network management, possibly decreasing the role played by traditional network management platforms.

Carnegie Mellon University (CMU) in Pittsburgh, for example, has a pilot project under way in which the Web displays traffic loads across campus network segments, the campus backbone and gateways connecting the school to the Internet and other sites.

"We haven't been using this as direct firefighting or debugging, but it's something that we're thinking about using," said Erikas Napjus, manager of network development at CMU. "We're very interested in making statistics available via the Web because it seems like the least common denominator for users and our staff."

The appeal of the Web is that it is "cross-platform," Napjus said. Macintoshes, PCs and Unix workstations can all see the same information, whereas management platforms usually require a staffer trained in Unix.

Indiana University is writing script files in PERL for Web servers and browsers that poll Simple Network Management Protocol agents on routers and hubs, and then prioritizes those devices by error rates.

The school is also using the Web to configure Cisco Systems, Inc. routers as ATM LAN emulation servers. It is developing custom Web pages with hotlinks to router commands on Cisco's Web site that take net administrators through a step-by-step diagnosis of LAN emulation configuration problems.

"Doing that is just as simple as providing a URL to those particular pages on the router," Robel said. "So there's absolutely no programming involved. It's just a really slick, elegant mechanism in my mind."

But stretching the Web to perform network management tasks also exposes the technology's limitations — shortcomings that may keep traditional Unix-based management platforms around for some time.

One of these limitations is a lack of easy access to stored management data, Robel said. Web tools are generally bereft of SQL database routines needed to cull historical data for trend analysis, he said.

That is where some of these monolithic platforms have a definite edge. "Maybe some companies can step forward and develop nice interfaces between the Web and specific network management [functions]" for access to distributed databases, Robel said. Another potential problem with Web technology is the security features of the Java programming language.

According to Napjus, Java does not allow users or devices to attach to certain port numbers. One of those port numbers may be 161, which is for SNMP queries and commands.

"It might not be possible to build something that talks SNMP directly from a Java applet," Napjus said. "That could clearly be a problem."

Chrysler Corp., meanwhile, is using the Web to host reports from Hewlett-Packard Co. NetMetrix LAN probes.

Though the Web is useful for enabling visibility into the managed environment, it does not approach the capability of platforms, said Mike Hardy, network management specialist at Chrysler heaquarters in Auburn Hills, Mich.

"If users are satisfied with the ability to view current status information, it's an excellent tool," Hardy said of the Web. "If you get into more interactive [tasks], then that user is probably beyond what a Web server was capable of providing anyway. Maybe they should have regular login access to the network management system."

Indeed, platforms will still be needed for discovering nodes, collecting topology information, processing events and launching applications, according to John McConnell, president of McConnell Consulting, Inc. in Boulder, Colo. But increasingly, the Web will be used as a front end to all of that activity. ■

NetworkWorld

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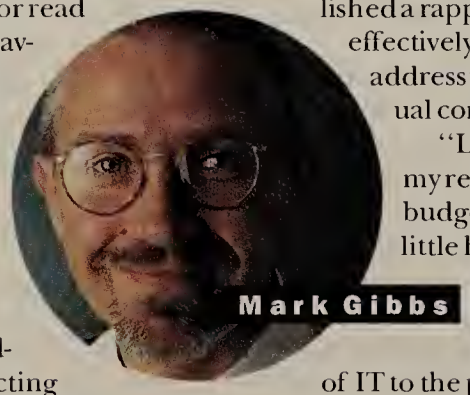
The corporate game: Battling budgets and playing politics

In this day and age, corporate politics are more important than ever. This is a problem for many IT professionals who have been in the industry a long time and think that doing a great job is what they are supposed to do. For all of you suffering from this kind of delusion, I take you now to a meeting of Acme MegaCorp, where the IT director (from the old school of networking) addressed the executive operating committee on the topic of his budget:

Are you suffering from the delusion that doing a great job is what you're supposed to do?

"Yeah, hi. Like I really don't want to be here when I gotta a ton of !@$% to deal with back in the Information Technology Group, but as you guys pay my salary, I thought I'd better haul ass up here, defend my budget request, and answer your dumb-a . . . er, doubts and questions.

"So let me start by saying that if any of you ever read my reports or read your E-mail rather than having your secretaries print them out and then throwing them straight in the recycle bin, you might have a clue about where we're at in IT.


Mark Gibbs

"Now I know you don't get it because I'm only asking for a 50% budget increase and you're acting like I just asked you to open Fort Knox. Listen, we only got two guys in IT serving 1,000 damn users! We put in the network (you do know we have one, don't you?) from scratch, we maintain it, fix it, do all that wild stuff with applications, work 15-hour days, six days a week, and we're treated like dirt.

"My huge budget increase (I bet it's less than a rounding error in the executive coffee fund) is not for luxuries. I only want one more guy and some crummy equipment as I documented in the E-mail message that none of you read.

"We save every penny we can, we recycle equipment as much as possible and we are so effective, we have a yearly downtime that you couldn't measure with a stopwatch. We are gods, we are incredible and we don't complain. So whatcha think . . . do I get my new budget?"

The result was, of course, that he got the same budget as the previous year and his was one of the jobs shed in the company's next downsizing exercise.

By way of contrast, the IT director of World Wide Widgets, Inc. was of the new school. His address to the executive operating committee was somewhat different:

"Ladies and gentlemen of the executive operating committee, I am honored to be invited to address you regarding the Information Technology Group's budget. I have been privileged to work with each of you on my Sundays off for the last six months, teaching you how to use the incredibly fast laptops that we purchased for you, and I feel that we have established a rapport where IT can effectively and efficiently address your unique individual computing needs.

"Let me say right off that my request for a 2,000% budget increase may seem a little high, but we need to put this in perspective. As you know, we have built up the size of IT to the point where every employee has his or her own analyst, programmer and support engineer.

"Now we need to build up the backroom staff so that we can actually build a network. I know that giving floppies to the IS staff to ferry around the building works very well, but we feel that we need to be more — how can I put it — on the cutting edge of technology.

"If you approve my budget, I can honestly say that we will reach new levels of efficiency within the company. I have prepared this four-color, glossy presentation document to show you just how great the annual report will look.

"So without wasting any more of your time, I would ask you to consider my, I believe, very reasonable budget proposal. Thank you for your time. My staff will now bring in the chilled vodka and caviar. And we washed your cars. Thank you, thank you, thank you."

His budget was approved.

How's your budget? Tell Gibbs at mgibbs@gibbs.com or call (800)-622-1108, Ext. 504.

And the winning fast LAN of the future is. . .Ethernet

People love to watch a good video at home. In some ways, the medium plays stronger in our psyche than the content. No one goes to a movie store; they go to the video store and rent videos.

This routine repeats itself millions of times each day. Yet most video buffs could not define key video technology acronyms such as VCR or VHS if their lives depended on it. Ironically, just 15 years ago, you had to understand specific video technologies to watch a movie at home.


Dave Buerger

Renters of a not-so-tender age recall distinguishing between two formats: VHS and Sony's technically superior Betamax. Cassette sizes differed for these incompatible formats. So video rental stores stocked movies in both formats until the surprisingly rapid popularity boom of VHS obliterated demand for Betamax.

Ethernet is the VHS of networking. Its installed base is nearly 100 million, growing by 30 million nodes each year, according to International Data Corp. Hardly anyone decides to use Ethernet; it is simply synonymous with networking.

Ethernet is the VHS of networking. Its installed base is nearly 100 million.

Ethernet is like VHS in other ways, too. Alternative movie formats, such as video disks, have challenged VHS. Most are technically superior, yet the majority of people stick with tried-and-true VHS.

New variants of Ethernet are likewise warding off high-speed network challengers. Fast Ethernet, Ethernet's 100M bit/sec cousin, is tromping rivals such as 100VG-AnyLAN and Asynchronous Transfer Mode.

According to a survey of 130 network managers released in March by Infonetics Research, Inc., 83% use Fast Ethernet to connect servers, 72% use it in the LAN backbone, 54% use it to delay implementing ATM, 43% use it instead of ATM, and 38% use it as an FDDI replacement.

Infonetics analyst J'Amy Napolitan said users' plans for using ATM are decreasing. "They have a bigger comfort level with Ethernet," she said.

That comfort is bound to increase as Ethernet performance leaps into hyperspace. Today, 11 vendors will officially form the Gigabit Ethernet Alliance, whose aim is to hammer out specifications for interoperability and jointly promote this next-generation technology. The products, which run 10 times faster than Fast Ethernet, are expected within two years.

Founding members include 3Com Corp., Bay Networks, Inc., Cisco Systems, Inc., Compaq Computer Corp., Granite Systems, Inc., Intel Corp., LSI Logic, Inc., Packet Engines, Inc., Sun Microsystems, Inc., UB Networks, Inc. and VLSI Technology.

Speed is just the start of gigabit Ethernet's attraction. If its designers succeed at their plan, the technology will be backward-compatible with both existing Ethernet and Fast Ethernet gear, it will support existing network protocols and it will support multimedia applications. Alliance members say users will get all these benefits at a low cost.

Only time will tell if alliance members will fulfill these promises. But if they do, it doesn't take a rocket scientist to divine ATM's future as a general-purpose LAN technology.

Gigabit Ethernet is an obvious hedge against the possible demise of ATM. Many alliance members are also pushing ATM. But they are not stupid. Better to have at least one horse capable of winning the race.

This hedge bet is good for users. It means vendors are finally bowing to users' desire for a less intimidating high-speed migration path. ATM may be a superior technology, but like VHS, users would rather stick with what they know.

Network buyer psychology is clearly becoming a more important factor in the acquisition process than mere technology. That's why VHS continues to dominate the home movie-delivery business. In the same vein, Ethernet and its variants continue to dominate networking.

Incidentally, VHS stands for video home system and VCR is videocassette recorder. But one shouldn't let a little knowledge go to one's head. We still need a teenager to set the darn clock!

Buerger is a networking industry consultant and writer in Atlanta. He can be reached at dave@buerger.com.

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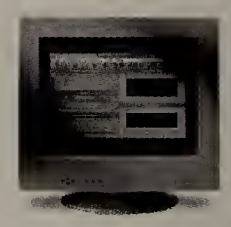

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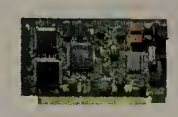

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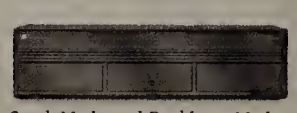

Access Stack Node and Backbone Node routers. High-speed network layer segmentation.

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